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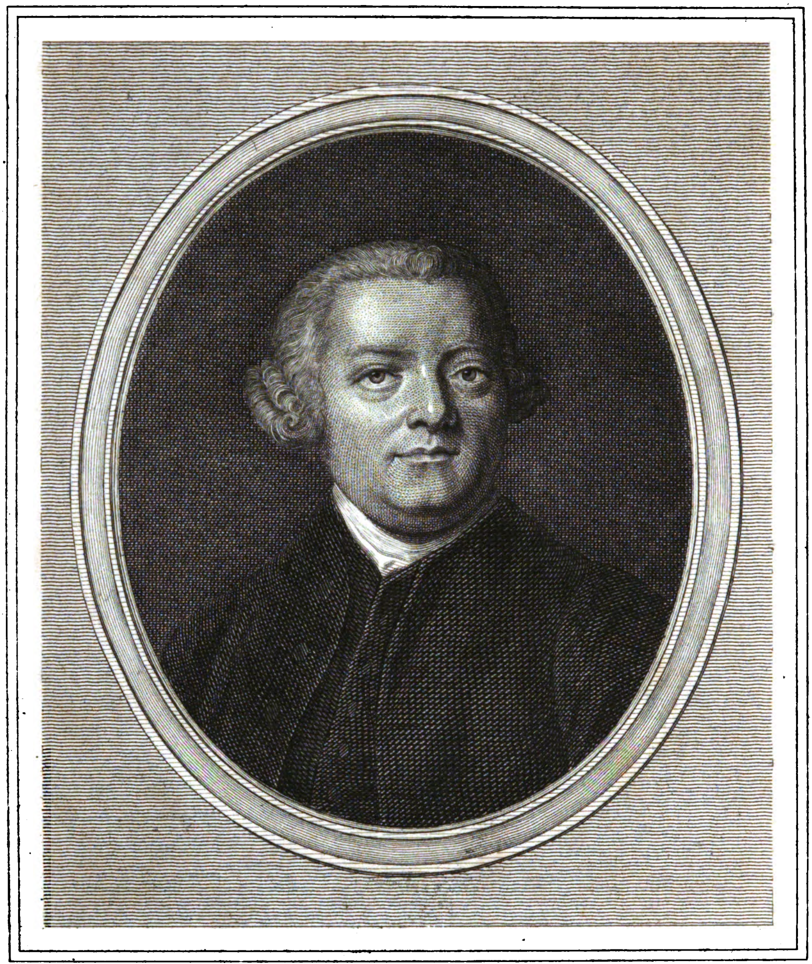

J^s Basire sculp.

RICHARD ALDWORTH NEVILLE, ESQ^R.

From an original in the poſseſsion of his Son Lord Braybrooke.

Published by J. Nichols & Son, May 1st 1810.

LITERARY LIFE

AND

SELECT WORKS

OF

BENJAMIN STILLINGFLEET,

SEVERAL OF WHICH HAVE
NEVER BEFORE BEEN PUBLISHED.

ILLUSTRATED WITH PLATES.

VOL. II. PART II.

NATURAL HISTORY.

LONDON:
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WORKS

ON

NATURAL HISTORY.

PREFACE

TO THE

MISCELLANEOUS TRACTS.

Remarks on the Utility of Natural History when applied to Husbandry.—Advantages derived from the Labours of Linnæus.—Defence of the Sexual System.

THE following pieces were selected from many others published by several ingenious members of that great, and hitherto unrivalled school of Natural History, the University of Upsal in Sweden, under the presidence of Linnæus *. They were selected, not as the only, or

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* Linnæus, Phil. Bot. p. 9, has these words, "vid. dissert. nostra de ficu." Now there is a piece in Amœnitates Academicæ, vol. I. on this subject, in which the matter referred to is contained. This piece goes under the name of Cornelius Hegardt, though Linnæus plainly quotes it as his own. How far that may be the case of all the other pieces in the Amœn. Acad. I cannot pretend to say. But it is most likely from the practice in foreign universities, in relation to theses held for degrees, that they must, in great part, be attributed to him at present.

Mr. Stillingfleet afterwards learnt from Dr. Solander, that the materials of these pieces were furnished by Linnæus. He adds, that the President employed each of his disciples in studying and investigating the nature of a plant, particularly in relation to soil, site, and aspect, time of flowering and foliation, and to what insects it fureven the most valuable, but as answering best the intention of the translator; which was to make known more generally how far all mankind are concerned in the study of Natural History, and thereby to encourage that branch of knowledge, and spread amongst all orders of men in this nation the improvements made by the excellent Linnæus.

His name, it must be confessed, has been for some time past in the mouths of people, but his works, I imagine, are little known, except to a few virtuosi who have a more than ordinary curiosity, and ardour to look into the minute parts of nature. It cannot indeed be otherwise. For to understand him and to make use of his method, requires more patience and time than are likely to fall to the share of the generality. My design therefore is not to exhort people indiscriminately to study his works; but, as I before observed, to give some idea how useful his pursuits are likely to become in many respects. There will appear, I imagine, such great and extensive views in relation to husbandry, physic, and the general œconomy of human life in these few specimens, that in this age and nation (where every useful art and science meet with generous encouragers) many will be found who will readily promote any rational endeavour to push these discoveries farther, or practise such hints, as may seem to bear a probable appearance of success.

nished food. The result of these observations he threw into the form of Essays, which were communicated to those who were to read dissertations on taking degrees, or on other occasions.

I can scarcely condemn mankind for treating with contempt a virtuoso whom they see employed in poring over a moss or an insect day after day, and spending his life in such seemingly unimportant and barren speculations. The first and most natural reflections which arise on this occasion must be to the disadvantage of such pursuits. Yet were the whole scene of nature laid open to our views; were we admitted to behold the connexions and dependencies of every thing on every other, and to trace the œconomy of nature through the smaller as well as the greater parts of this globe, we might perhaps be obliged to own we were mistaken, and to confess that the supreme Architect had contrived his works in such a manner, that we cannot properly be said to be unconcerned in any one of them; and therefore that studies which seem upon a slight view quite useless, may in the end appear to be of no small importance to mankind. Nay, were we only to look back into the history of arts and sciences, we must be convinced, that we are apt to judge over hastily of things of this nature. We should there find many proofs, that he who gave this instinctive curiosity to some of his creatures, gave it for good and great purposes, and that he rewards with useful discoveries all these minute researches.

It is true this does not always happen to the searcher, or his contemporaries, nor even sometimes to the succeeding generation; but I am apt to think that advantages of one kind or other always accrue to mankind from such pursuits. Some men are born to observe and record what perhaps by itself is perfectly useless, but yet of great importance to another, who follows and goes a step farther still as useless. To him another succeeds, and thus by degrees, till at last one of a superior genius, laying all that has been done before his time together, brings on a new face of things, improves, adorns, and exalts human society.

All those speculations concerning lines and numbers so ardently pursued, and so exquisitely conducted by the Grecians; what did they aim at? or what did they produce for ages? A little arithmetic, and the first elements of geometry, were all they had need of. This Plato asserts; and though, being himself an able mathematician and remarkably fond of these sciences, he recommends the study of them; yet he makes use of motives that have no relation to the common purposes of life.

When Kepler, from a blind and strong impulse merely to find analogies in nature, discovered that famous analogy between the distances of the several planets from the sun, and the periods in which they compleat their revolutions; of what importance was it to him or to the world?

Again, when Galileo, pushed on by the same irresistible curiosity, found out the law by which bodies fall to the earth, did he, or could he, foresee that any good would come from his ingenious theorems, or was any immediate use made of them?

Yet had not the Greeks pushed their abstract speculations so far; had not Kepler and Galileo made the above-mentioned discoveries, we never could have seen the greatest work that ever came from the hands of man. Every one will guess that I mean Sir Isaac Newton's Principia.

Some obscure person, whose name is not so much as known, diverting himself idly, as a stander-by would have thought, with trying experiments on a seemingly contemptible piece of stone, found out the Compass, a guide for mariners on the ocean, and such a guide as no science, however subtile and sublime its speculations may be, however wonderful its conclusions, would ever have arrived at. It was bare curiosity that induced Sir Thomas Millington * to examine the minute parts of flowers; but his discoveries have produced the most perfect, and most useful system of Botany that the world has yet seen.

Other instances might be produced to prove, that bare curiosity in one age is the source of the greatest utility in

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* Sir Thomas Millington, here alluded to, was Savilian Professor at Oxford. He made some curious discoveries on the minute parts of plants, particularly the flowers, which he communicated to Dr. Grew, who laid them before the Royal Society, in a Lecture on the Anatomy of Flowers, read Nov. 6, 1676. See Pulteney's English Botany, vol. I. p. 337.

another. And what has frequently been said of Chymists, may be applied to every other kind of virtuosi. They hunt perhaps after chimæras and impossibilities, they find something really valuable by the bye. We are but instruments under the Supreme Director, and do not so much as know in many cases what is of most importance for us to search after. But we may be sure of one thing, *viz.* that if we study and follow nature, whatever paths we are led into, we shall at last arrive at something valuable to ourselves and others, but of what kind we must be content to remain ignorant.

I am sensible that after all I have said, or can say, many people will not be persuaded to allow that the study of some parts of natural history can be worthy of a rational creature. They will never vouchsafe to look on mosses and insects in this light. Yet why may not the study of these likewise have its use in future times? It ought to be considered that the number of the latter is immense, that but lately any great attention has been paid to them, that one of them is and has been long the means of cloathing thousands and feeding more, that another affords us honey, another a fine dye, not to mention some few besides, of acknowledged benefit to mankind. Lastly, that they are capable of doing us the greatest mischief, and that, perhaps, a more thorough knowledge of them may instruct us how to secure ourselves against their attacks. Whether this be possible we can never know, till proper encouragement has been given to this branch of Natural History.

Something to the same purpose might be said concerning mosses, but as the intent of one of the following pieces * is principally to take off such objections as I have been considering, I shall, instead of dwelling on this subject, proceed to give a short account of what Linnæus has done towards the improvement of Natural History, that the reader who is unacquainted with his works may form some idea, though very imperfect, of this great man †.

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* The treatise on the Use of Curiosity, from which we quote the passage to which he here alludes. "The vulgar think, and those who deem themselves wiser than the vulgar scruple not to say, let him who has nothing to do employ himself in hunting after mosses and flies. By this they would insinuate, that searching after the minute plants and animals is unbecoming, or at least unnecessary for a rational creature. As for mosses, I grant we have no authority on our side, for till the end of the last century they were almost wholly neglected; but within these fifty years their history is nearly completed, by the diligence of Dillenius, who has described near 600. With unwearied assiduity he went through this very difficult and extensive branch of Natural History. But it is asked, To what end? I will not endeavour to answer this question by shewing the particular use of every moss that grows, although I am certain that the Lord of nature has made nothing in vain. But I will venture to assert, that posterity will, some time or other, derive as many advantages from mosses as from other vegetables; and in this I am justified from those which our few experiments on mosses have enabled us to ascertain."

Miscellaneous Tracts, p. 176--182.

† The introduction of specific names was a most important improvement, as it removed the immense labour of remembering the tedious and discordant nomenclature of former botanists.

The Philosophia Botanica was once recommended to a deep

First then, he has invented a new system of Botany, founded on the male and female organs in plants, a system which has thrown a new light over that science. He has defined about 10,000 plants, ranged them into classes, genera and species, given new and regular generical names to many, instead of those barbarous and uncouth ones which prevailed till his time, and added specifical names to all, short, easy, and oftentimes significant, a thing never so much as attempted before. He has brought into Botany a precision, conciseness, and elegance, that were very much wanted. He has observed and given names to parts of plants not noticed by any other Botanist, parts which in some cases are sufficient as well as necessary to distinguish the genus and the species.

The Philosophia Botanica * of this author affords throughout instances of this reformation. Had he written no other book, he would have deserved the highest praise from all lovers of botany. For,

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mathematician on account of its systematical arrangement ; his opinion was, that it contained one of the finest methods of analytical reasoning he had ever perused.

* In 1750, when he was writing this book, as he tells us in the preface, he was hindered by a terrible fit of the gout, that broke the strength of his mind as well as body. In 1755, he says, Flor. Suec. article 450, that he had been freed from the gout for some years by eating great quantities of fresh strawberries. He adds that this fruit dissolves the tartar of the teeth, that it is remarkably good for people afflicted with the stone or gout, and may be safely eaten in abundance.

besides the amendments just mentioned, it comprehends, in a short compass, something of consequence in every branch of that part of Natural History, and affords hints for various discoveries; hints that must, if pursued, produce many considerable improvements in physic, husbandry, and œconomy.

He has published a Materia Medica so far as relates to plants, in which he has undertaken to determine many species commonly used, but not sufficiently ascertained; adding throughout, in the shortest manner possible, what he has found to be useless or efficacious; and, as he assures us, never highly recommends any without being thoroughly convinced of their virtues, from his own experience, in the hospitals where he presided. Some of these medicines have not yet, I believe, been received into our shops, but they may possibly deserve consideration.

In the last edition of his "Systema Naturæ *," he has mentioned above 1500 species of insects, has classed them all, divided them into genera and species, de-

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* "This branch of Natural History," observes an accurate judge, "before the time of Linnæus was nearly without method; for though the œconomy, structure, and metamorphoses of insects had been elucidated by various authors, and numberless species had been accurately figured and described, yet no one had constituted a general arrangement, that enabled the student to investigate them with facility." Maton's edition of Pulteney's Life of Linnæus.

In the subsequent editions the number of species was considerably augmented; the 13th, published by Gmelin, contained 11,000 of the Insectæ, and of the Vermes 6000. Ibid. p. 223---236.

scribed them as to the minutest parts, so far as was necessary to distinguish them; marked the places where they are to be found, the plants upon which they feed, their transformations, cited the authors who have treated on them, and given them classical, generical, and trivial, or specifical names. He has done the same by birds, fishes, and all other known animals; he has also ranged all the fossils, minerals, and stones, to use his language, in a manner partly borrowed, and partly founded on his own observations. But what improvements and additions he has lately made to this part of Natural History, as well as that of plants, we cannot say till the other part of his new edition of the System of Nature comes out, which is expected daily. However, what we see he has done in relation to animals, leaves us no room to doubt but that it will altogether be the most extraordinary book that was ever published in this or almost any other way *.

Besides his writings, of which I have mentioned but a small part, this indefatigable man, born to be Nature's historian, has travelled over Lapland, all Sweden, part of Norway, Denmark, Germany, Holland, England, and France, in search of knowledge. That part of his travels, which is published in Latin, has many curious

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* Mr. Stillingfleet here refers to the tenth edition of this remarkable work, published in 1758; but before his death he had the satisfaction to see it completed in the twelfth edition, published at Stockholm, in 3 volumes, in 1766, 7, and 8.

See Maton's edition of Pulteney's Life of Linnæus, p. 171.

and useful observations relating to the purposes of common life. Of those which are written in his own tongue I cannot give any other account, except that by some quotations from them in the writings of his disciples it appears, they well deserve to be communicated to the world in a language more generally understood.

Besides these labours of his own, the world will be one day obliged to him for what others have done. Incited by his example and persuasion, C. Ternstrom went into Asia; P. Kalmius to Pensilvania and Canada; L. Montin into one part of Lapland; D. Solander into another; F. Hasselquist into Ægypt and Palestine; O. Toren to Malabar and Surat; P. Osbech to China and Java; P. Loefling to Spain and America; P. J. Berg to Gothland; M. Koehler to Italy and Apulia; and D. Rolander to Surinam and St. Eustacia; all these with a view to the promotion of Natural History. When we consider him in this light of a master of such disciples as these, and many others, some of whose works are contained in this publication, he must appear like Homer at the head of the poets, Socrates at the head of Greek moralists, and our Newton at the head of the mathematical philosophers. Among all these extraordinary qualifications there appeared throughout his writings spirit, candour, a due regard for others, and proper modesty and diffidence of himself.

I will give a short specimen of his way of thinking in relation to the degree of human knowledge hitherto attained by man on the subject of Natural History. A subject on which it was very natural for a less extensive genius to be vain, as he has had so great a share himself in the advancement of it. The passage is taken from the introduction to the new edition of his system of nature, and is to this effect. "How small a part of the great works of Nature is laid open to our eyes, and how many things are going on in secret of which we know nothing! How many things are there with which this age was first acquainted! How many things, of which we are ignorant, will come to light when all memory of us shall be no more! For Nature does not at once reveal all her secrets. We are apt to look on ourselves as already admitted into the sanctuary of her temple, we are still only in the porch. I have entered, adds he, into the thick and shady woods of nature, which are every where beset with thorns and briars. I have endeavoured, as much as possible, to keep clear of them; but experience has taught me that there is no man so circumspect as never to forget himself, and therefore I have borne with patience the sneers of the malevolent, and the buffooneries of those whose vivacity is exerted only to molest and give offence to others. I have, in spite of these insults, kept on steadily in my old path, and have finished the course I was destined for."

The latter part of this passage shews that he has not been without his enemies, and that he has suffered in the same way as the most curious enquirers into Nature in all ages. The warmth of his expressions, which is still stronger in the original, plainly proves that they have not used fair arguments against him; but like interested rivals, or men of a superficial understanding, have endeavoured to subject him and his labours to ridicule. But whatever has been his fate in his own country, as far as I know, his name is almost universally mentioned with respect in all other parts of Europe. It is true, objections have been made to his innovations in other places besides Sweden, which must unavoidably happen on many accounts; but particularly because those natural historians who had been brought up and inured to other systems, who had learned things by other names, and could not easily attain the new ones, must have strong prejudices on this occasion. This objection being personal, I shall not consider it any further; but readily allow that great indulgence is due to such people, and that their fate is to be pitied for coming into the world too soon to be enlightened farther on subjects, which perhaps had employed the greater part of their life. But there are prejudices of another sort which I cannot omit to consider more fully on this occasion.

It must, however, be premised, that the use and intent of a classical system in any part of Natural History, is not to range things according to their natural connections in regard to their outward aspects, or essential qualities, or their medicinal or œconomical properties;

but in such a manner that from the due examination of a plant, mineral or animal, a naturalist may certainly give its true name according to some system. He who goes farther than this is not barely a naturalist, but something more, *viz.* a physician, a chymist, a farmer, a gardener; and he who cannot go thus far to a certain degree, does not deserve the name of a naturalist, however skilful he may be in the virtues and properties of bodies animate and inanimate.

The use then and intent of a classical system is nothing more than that of a dictionary, where no one complains that words totally unconnected in sense are put near one another. The question therefore as to the sexual system, in plants, is not whether they be ranged naturally, but whether in the best manner possible in order to be known. Nay farther, it matters not whether the sexual system be founded on nature or not, whether there be any propagation by seeds without male and female organs. The whole to be considered is whether those parts which are called, and I believe truly called so, do really exist, and whether they for the most part exist so uniformly, as to furnish marks sufficient to distinguish the classes. Nor does it matter whether it be hard to distinguish those marks, but whether they can with proper care and patience be distinguished, whether we can surely distinguish plants, without observing those nice and minute parts, and whether a system has been found equally sure with the Linnæan, without having regard to those parts. Those who think so would do well to inform the world of their discovery, and not make objections that affect only the obscurity of nature, when they mean to condemn a system which is obscure merely from its consonancy to nature. If Providence has thought fit to write in cyphers, shall he be blamed who endeavours to give a key to its works, because some men cannot distinguish one stroke from another in the cypher?

Those who have not learned to read the characters of nature for want of leisure, patience, or any other cause, ought not to complain that Linnæus cannot make them skilful in a part of knowledge they are not qualified for. If a man unacquainted with the learned languages wants to know the meaning of a Greek word, will he complain of the Lexicon, because he cannot find it? certainly not. Neither ought we to complain of Linnæus in a similar case.

This, I think, is a full answer to all the objections that have or can be made to his system in general. What errors he has committed according to his own principles, in relation to particulars, is quite another question. I am one of those who think him not free from errors. Nor is it wonderful that he should fall into some, but it is truly wonderful that one man should be able to invent and carry so far so nice and extensive a system, especially when we consider, not only what he has done in Botany, but what he has done in all the branches of Natural History besides, and some of them almost entirely neglected before his time. I should therefore wish that those who are fond of this part of knowledge would, instead of making frivolous objections, try by an accurate and diligent examination to rectify his mistakes, and thereby help to perfect a system which deserves the utmost attention, and commendation.

Though I said above, that it matters not whether the sexual system be founded on nature or not; yet it was natural for the inventor to endeavour by all proper means to vindicate it as likely to be so; and this he has done to the satisfaction of the most curious observers; and I will venture to add, that it is natural for others likewise to embrace with zeal a system that puts the works of Providence in so new and beautiful a light by continuing the analogy from the animate to the inanimate creation. It seems as if Providence intended to lead men to this discovery by striking our senses so intensely and so agreeably with those very parts which contain the clue of this system. Yet such is the inattention and inaccuracy of man on certain points, that even a tolerable conjecture concerning the use of those parts was not made till the year 1676 *.

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* Mr. Stillingfleet alludes to the discoveries of Dr. Grew, which were communicated to the Royal Society in a lecture on the Anatomy of Flowers, read Nov. 6, 1676. Doubts have been entertained whether Dr. Grew was the original discoverer, or received it from Sir Thomas Millington; but this fact is of no great importance to the science itself. We refer the reader to Pulteney's English Botany, vol. I. ch. 25, for an elucidation of the subject.

Having finished all that I think necessary to say concerning Linnæus and his works, I shall now come to what relates immediately to myself only. First then as to the translation, I have endeavoured to avoid making it too literal, and servile; but yet, I hope, without taking any undue liberties, or deviating from the sense of the originals.

The part which is likely to prove least agreeable to the reader, is that which was most troublesome to the translator, I mean the names of things not generally known. Some of these I have been obliged to leave in Latin, not being able to find any English names for them. I will not pretend to have avoided all mistakes on this head; but it is certain I should have committed more, as well as have had much more trouble, had it not been for the assistance of the ingenious Mr. Hudson *, whose skill in all the branches of natural history, and particularly those relating to his profession as an apothecary, cannot fail to recommend him to the favour of the publick. To him I likewise owe the ascertaining of some of the grasses, one of which, *viz.* the small bent grass, which I had in my collection, but knew not where I found it, he discovered to be the *Gramen Minimum Anglobritanum*, mentioned in the "Indiculus Plantarum Dubiarum," at the end of Ray's Synopsis.

I must not omit also on this occasion to acknowledge my obligation to that excellent botanist Dr. Watson *, for favouring me with a perusal of his collection of grasses, which was of no small service to me.

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* Afterwards well known as the celebrated author of the "Flora Anglica," and other botanical pieces.

But to return to the translation: I said that I did not pretend to have avoided all mistakes in relation to the names of things; I will now extend this farther, and own my suspicions that I have made some in relation to other particulars; but I hope they are of such a kind only as may be looked on with indulgence by the learned; especially when they consider the great variety of subjects treated on in these pages, of none of which subjects I profess to be a master, and therefore do not undertake to teach such readers; but on the contrary shall always be ready, and even desirous, to receive instructions from them. I beg they will also consider that I do not aim at letting the unlearned into the mysteries of this part of knowledge, or even teaching them the elements of it. My business is only to excite curiosity, and therefore small errors can be of no consequence. What I have farther to say will be found in notes.

Res summas initio deberi parvo ac debili experientia omnium temporum testatur. Amœnit. Acad. vol. II. p. 266. § 2. †

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* Doctor, afterwards Sir William Watson, was an eminent Physician in London, and among the earliest and ablest promoters of the Linnæan System in England. For an account of him see Pulteney's English Botany, vol. II. p. 296.

† The experience of all ages proves that the most important things are often derived from light and trifling causes.

A DISCOURSE

CONCERNING THE

IRRITABILITY OF SOME FLOWERS.

A NEW DISCOVERY.

TRANSLATED FROM THE ITALIAN OF

COUNT GIOVANNI DEL COLVOLA.

MR. STILLINGFLEET'S PREFACE.

THOUGH it may seem unnecessary to prefix any preface to the following small piece; yet I cannot omit this opportunity of making a few observations, most of which, according to the present unartful and vicious mode of writing, I should have thrown into notes, had I not felt that notes are always a disagreeable incumbrance to the reader, and therefore should always be avoided, when it is possible.

I mean not to make an encomium upon the author of this tract; yet this much I cannot help saying, that perhaps a more curious discovery was never made in the botanical way. Elastic motions in plants have been observed by many writers before: such as appear in the closing and opening of leaves and flowers, according to the temperature of the air, or according to the hour of the day; to enumerate all which would be unnecessary on this occasion. Some of these discoveries are of a very antient date, even as early as the first writers on Botany;

others are more modern, and even recent; but all very well deserving the attention of such as think the works of Providence not beneath their notice.

The mechanism of impregnation in plants is a subject never before observed, that I know of, in this way. The parts of fructification, it is true, have been noticed and described, and their uses understood, ever since the time of Sir Thomas Millington; but all hitherto known falls far short of what our Italian has discovered, about the power of motion seemingly necessary to the impregnation of the germ.

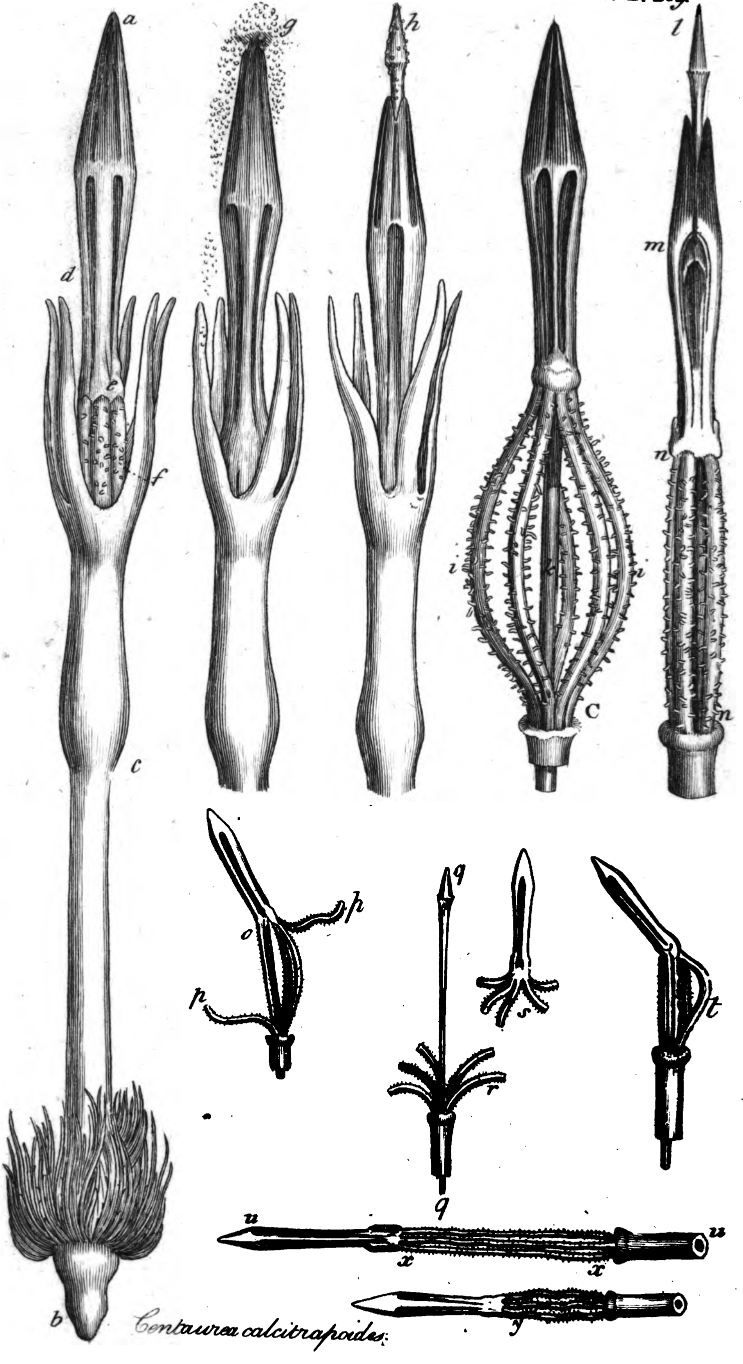
Our author observes, as a wonderful phænomenon, that the filaments grow shorter by contraction, and yet do not increase in bulk. This no doubt is wonderful; but not incredible to such as are acquainted with anatomy. We need not indeed go far in search of wonders. We shall meet with them wherever we turn our eyes with attention. We live in the midst of a most exquisite and mysterious machine; and all that the acutest philosophy can do is to end where it begins; in ignorance and admiration. It does by no means from hence follow, that philosophical studies are useless; for in our inquiries we frequently trace out the laws by which Providence acts; and to know his laws is, on many occasions, to know causes so far as it concerns us. For by that knowledge we are enabled to produce effects, as effects depend upon the separation, juxta-position, composition, resolution, &c. of masses and particles of matter.

It must afford great pleasure to all true lovers of knowledge, to see the spirit of inquiry into nature begin to take place in many parts of Europe; and societies for that purpose erected, in imitation of those useful ones first set on foot in these kingdoms. We may hope henceforward to receive ingenious and important discoveries from those countries, where hitherto little else has been produced but subtleties, disgraceful to human reason, and destructive of human happiness. In Italy particularly we may reasonably expect this will be the case, where the great and first systematical botanist among the moderns lived, I mean Cæsalpinus, to whom most of the late improvements in that way have been owing.

The flower upon which all the experiments exhibited in this tract were made is the *Centaurea calcitrapoides*, Lin. Sp. which is a species nearly approaching to the star-thistle, Hud. Flor. Ang. *Centaurea calcitrapa*, common on sandy roads in this kingdom, and differing from it only in the leaf, according to Linnæus, who calls it the parent of the former; so that perhaps it may be full as proper to make experiments upon, if any one is disposed to repeat them.

The mere English reader will, I hope, excuse me for making use of technical terms, as being absolutely unavoidable: they will be easily understood by means of the figures, along with the explications; and I believe those who are more curious than knowing in botany, will get a better idea of the syngenesious flowers here than in any other book.

To front P. 209.



Centaurea calcitrapoides.

A DISCOURSE

ON THE

IRRITABILITY OF SOME FLOWERS.

VARIOUS kinds of motions have been observed in various Plants; but not one perhaps so curious and entertaining as that which I discovered by chance in passing by the foot of mount Vesuvius, about four years ago. There is none of you, Gentlemen, who is not acquainted with the beauty of those shores, and what incitement to contemplation the earth and sea afford to a philosophical mind. As you have done me the honour of associating me to your most illustrious society, I cannot shew in a better manner my sense of that obligation, than by giving you an account of my discovery.

I am talking to botanists, who have no need of my instructions, in order to distinguish the different classes of plants. You know already what is meant by compound flowers, which are all by Linnæus ranged under the class of Syngenesious; if indeed they ought to be called flowers, and not rather natural groupes or masses of real floscules, whichever name you please to call them by: They stand together, surrounded by a common calyx or cup, and are supported by one stalk.

If you touch the point of one of these floscules slightly with your finger, or the point of a pin, or any other thing, immediately it moves of itself, as if awakened: nor is this motion caused by the shock, which is too gentle to produce such an effect.

How many, and what plants of this class, bear floscules of so sensitive a nature, is difficult to determine; nor do I pretend to enumerate them. I shall confine myself to such as I have made trials upon; and I presume it will not be disagreeable to have the list of them, which is but short, as it would be an endless and useless task to make trials on all the species. I shall follow the arrangement of Linnæus, and make use of his names.

The genera upon which I have made trials are the thistles, plants well known, and common in all our fields; the cnicus, much celebrated by physicians; the saw-worts, that grow on the neighbouring hills; the cinaræ, the most useful of which kind is the artichoke; the distaff-thistle; the bastard saffron, which is used for dying yellow, and rose-colour; the globe-thistle with spherical heads all adorned with flowers; and the burdock with those vast leaves, growing in moist places.

Linnæus calls all these plants *Polygamiæ æquales*, alluding to the floscules, which are all exactly similar in every part of the flower. He distinguishes these farther by their particular form, which he calls tubipetalous, *i. e.* flowers that have a tube or sheath. It is probable that many others of this genus, if not all, have the same quality as those I have mentioned.

There are certain other syngenesious plants not belonging to the *polygamiæ æquales*; allow me to make use of those terms. Amongst the former is the numerous genus called *centaury*; and though many of this genus resemble the thistle, yet Linnæus has thought fit to distinguish and place them under different heads, putting the centaury amongst the *polygamiæ frustraneæ*; because amongst many perfect and fruitful floscules there are in every flower others round the edges, deficient in their construction, and consequently useless to all appearance, and certainly barren.

Out of this genus I chose, for the trials I undertook, the following species, as being one of the most sensitive, and as growing in great abundance in your fine garden, and therefore more adapted than any other to the present purpose. The species is Centaurea calcitrapoides calycibus subduplicato spinosis, foliis amplexicantibus indivisis serratis. L. Spec. Pl. The floscules in the annexed plate are taken from this plant, all made designedly bigger than nature; nay some of them vastly enlarged, such as they appear by a very great magnifier. For the rest I shall do no more than relate what observations I have made on this species alone, being content to give a general idea of the abovementioned accident. To you, who are more skilful botanists than I pretend to be, I shall resign the pleasing task of ascertaining this discovery; for which your talents qualify you, and to which this place, and the philosophical aim of your society, naturally may invite you.

Imagine one of these floscules separated entire and undivided, if possible, from the rest of the flower; such as you see in fig. *a b c d e f.* To say the truth indeed, it is no easy matter to separate unhurt a floscule of so tender and brittle a nature from a thick croud of many similar ones, which are deeply fixed into the cup. The best way therefore is to cut through the whole mass of the flower with a sharp knife, by which means the inside being laid open to view, one of the floscules may be drawn, with a light hand, out of its natural situation.

The floscules are unripe, whilst the germen *b* being of a heart-shape, tender, and white, rises a little above the common receptacle, where it is fixed amongst that thick bush of long threads arising from the cup.

The very long style which is supported by the germ, like a column upon a base, stands perpendicular, and is included as in a vest in the corolla *c d.* The corolla, till it gets out of the calyx, is nothing but a pipe or tube, situated upon the common base of the germ. Upon the edge of the germ stands a number of short hairs, which form a crown, and, outliving the flower, remain upon the seed when ripe; but are now small, moist, clear, and of a silver colour. That part of the corolla which is out of the cup, is larger *c*, and terminates in five points *d;* these points are of a faint violet colour. The corolla is not unlike a hyacinth.

The stigma, not yet exposed to the sun's rays, is surrounded by a sheath pointed at top *a*, of a hard texture and violet colour. This sheath is formed of five antheræ joined together at their heads. It resembles a small Gothic tower with five sides; to which are affixed five filaments, like so many ribs *i i*. The filaments surround the style *k*, which is in the middle of the corolla *c*, and are fixed in such a manner that they seem to have their roots just at the termination of the tube; where it arises out of the cup, and where the corolla, as was before-mentioned, begins to take the form of a hyacinth. It is certain, however, that in this part precisely there is observed a swelling like a ring; and that under this swelling the filaments continue to descend quite to the germ, through the whole tube. They are indeed changed into five very slender prominent stripes or slips, fastened to the internal membrane of the tube or pipe; I say internal, because the corolla is divisible as it were into two coats; and the whole outer coat may be stripped off, and the internal left.

Now, if you but just touch one of these floscules, you will behold a surprizing phænomenon. The floscule immediately becomes sensible of the touch, and moves itself; bending sometimes on one side, sometimes on another; sometimes twisting itself at the same time that it descends, and that in various ways, according to various accidents, or according to the part touched, for it generally bends itself on that side. It rises again, but slower, as if a second force constrained it to set itself right: not that it returns exactly to its first high and erect situation as before the touch. Nay I have observed in more than one, and I am sure I do not deceive myself, a sort of beginning undulation, but so short that the whole was finished in the first effort to descend, and then in giving some slight signs of rising.

It would be a new amusement, therefore, to touch gently with the finger the flowers as you meet them in the fields, and thus raise up tumults in those families of floscules; for they move confusedly different ways; as when in a public shew, if some unforeseen alarm disturbs the tranquillity of the spectators, in an instant innumerable heads are seen irregularly and variously agitated, which a minute before were ranged in the greatest order.

Once touching is sufficient to debilitate the floscules, and render them unable to move themselves again, touch as much as you please. This languor lasts three minutes at most, till the floscule in this short repose is refreshed, and regains its first vigour.

But when the floscules are riper an accident still more entertaining happens. The farina now being mature, the floscule, when touched, not only moves as before, but the point of the tower, formed by the antheræ, is seen to open in its five sides, and a great quantity of the farina *g* is driven out; till either all that part of the farina, which cannot support itself on the point, falls whilst still fresh in a sort of cloud; or else supports itself only till the wind or the sun's beams parch and dissolve it into a dry dust. If when the floscules are nearly ripe you open the tower, but so gently that the contents may not be touched, you will find almost all the farina heaped together in the sharp point *a*, which farina is supported by the increasing point of the stigma, and remaining there shut up, takes the conic form of the hollow. But if the floscules are not so mature, the farina is found sticking to the inside of the lower part of the tower, the top being quite empty; nay, in some kinds of centaury the hollow is transparent, though not in the species under consideration, on account of its deep colour.

When the flower is more ripe, or has been often touched, the point itself of the stigma comes out covered with the farina, which by means of its glue fastens itself all round; and as it advances farther, it takes up still more of the farina, with its necklace or garland, composed of very short threads *l*. For we may go so far in teazing, as it were, the floscules, that not only all the stigma may come out, but even some part of the style, if we use our utmost endeavours.

This always happens of itself when the flower grows old; and it is certain that the floscules must, without being touched, go through all these changes in the short course of their lives. But when they are arrived at this period, they are no longer sensitive; and, as if this was the beginning of death, from henceforward nothing but decay is seen. First, that turret of the antheræ, now faded along with the filaments, grows dry soon after the corolla, and lastly the style and stigma. When this falls, all the carcase of the machine falls too, leaving upon the receptacle that germ which is now become ripe fruit, and ripe seed, adorned with that crown of hairs which qualifies it for flying when the wind lays hold of it, after it is once loosened from the dry calyx. Those common play-things, which we call shuttle-cocks, made with a crown of feathers, in order to support them in the air, exactly resemble these seeds.

So that the life of these flowers is nothing but an unfolding of the parts, which is followed by death. It is therefore difficult to determine the length of its life. This only I have observed, that the heats of summer shorten it; nay, at that time the phænomena above mentioned are seen only in the cool of the morning; because all the floscules are become old and withered, if you put off the examination of them till the great heat comes on. Again in the spring, and very near the autumn, their life is longer, and remains whole days.

Thus have I represented this extraordinary motion of the floscules; but certainly none of the parts described have any intrinsic motive faculty; nor are they sensible of this motion. Upon endeavouring to find out the secret cause of these phænomena, a thousand thoughts occurred; but not being content, I applied again to my experiments, till at length, after many fruitless trials, nature shewed herself to me, and I discovered here first in Florence the mechanism which causes this motion. My most ingenious friend Signior Raimondo Cocchi, by proposing doubts, gave an additional impulse to my curiosity; and indeed it was extremely difficult to keep the mind quiet, and bring it to be content under its ignorance. The fact is, that all depends upon the five filaments, which are placed almost entirely within the corollæ. These sustain that little turret of the antheræ, and with their motions cause it to descend.

Whoever has a desire to behold this scene laid open, must with great attention make use of a sharp pair of scissars, slitting the corolla longways on opposite sides, and then cutting away entirely the parts. This operation may be performed upon the floscule, even without removing it out of the flower; and when it does not succeed, it is always the fault of the operator. After this operation appears a little piece of mechanism *i i*, composed of the straight style *k* in the middle, and of the five filaments round about *i i*. The style rises from the very bottom of the flower, and enters under the antheræ. The five filaments are bent outwards, and detached from the style, although both below and above they are united, *i. e.* at the thick part of the corolla where they end, and where they join at the base of the antheræ to the five sides of the turret. This whole machine together is not unlike a distaff.

Let us now touch the turret of this naked floscule, immediately we shall see all the arched five filaments retire towards the style, and become strait, *n n*. Indeed, on the first opening of the corolla, they are all found so, because in the operation they are necessarily touched by the knife. It is wonderful that these arches, contrary to what a geometrician would expect, upon straightening themselves, so far from growing longer, become shorter, so that the turret does not rise, but sinks, being drawn down by these five chords. Another thing still more strange happens; which is, that these filaments, when shortened, do not seem in the least bigger, either to the naked eye or by the microscope, as far as can be perceived. We can say nothing of what is invisible.

This mysterious power of motion plainly resides no where but in the five filaments; nay it appears in each of them separately. In fact, every time we touch any of them, that alone contracts; and because the others, not being touched, do not move, that alone, by drawing the turret, makes it incline on its own side only *o*. Nor does the motion communicate itself to the others, although, by bending the upper part of the floscule, the other filaments ought of course to bend a little, as in fact it happens. If by way of amusement we touch all the filaments one after another, we shall see the turret forced to incline gradually all round, till at last it becomes quite lowered and strait, when all the filaments are contracted.

If we leave the floscule quiet, the sensitive distaff by little and little regains its first form; and the turret rises as the filaments grow longer, but never quite so high as at first. However, we must wait three minutes, as I said before, for this effect.

From what I have laid before the reader, I imagine, all the rest will easily be understood.

The filaments have an unknown power of contraction, which performs every thing, because all these motions are reduced to the descent of the antheræ. When the floscules bend on one side, it is owing to one of these two things, either that the motion was communicated unequally, and not to all the filaments at once; or that the flower was not advanced enough towards maturity, and the turret of the antheræ was too stubborn to be opened by the impulse of the stigma, which points directly into the farina that fills the top of the turret, and is itself immature and glutinous. However, at last the turret is forced to give way, and the farina is driven out by the stigma, as water through a pipe by a piston, till by the contraction of the filaments the whole stigma gets out of the antheræ.

It is the same cause, I imagine, that makes the farina rise from the lower parts of the turret to the top. For when the filaments are strait, the tower sinks, and passes over the stigma which remains firm: hence the farina, which is ripening and becoming more easy to separate, and perhaps obstructs the narrow passage, is taken up in the way, and carried more towards the top; and when arrived thither, must promote its own exit, as it draws along with it the mass already separated, which surrounds the stigma; so that all the farina, after many operations, must at last necessarily be deposited under the point of the tower, in that void space, either small or great, which is not occupied by the stigma. From hence it is very likely that the filaments contract very frequently, by the appointment of nature, as the atmosphere, or other external causes, work upon them. But this is not all. For we may hence give an account how it happens sometimes that the immature floscules on being touched become bent more than usual, so as almost to lie down, and never rise again *l*. Nay the more the floscule is touched, the more it bends. In its immature state it happens, that the style not being sufficiently vigorous, finds an obstacle too strong for it in the antheræ; and being pushed on by its own elastic power, is driven through one of the intervals of the distaff, in a great measure out of its natural situation *t*; because the corolla yields and gives way. The filaments then growing strait as usual by an external stimulus, the style bends always more and more, so that it cannot regain its original situation, and the whole floscule remains for ever bent. I have seen whole families of these floscules, that is, all belonging to one flower, in this unnatural state.

The whole mystery therefore is reduced to this contracting power in the filaments alone.

I have cut from the distaff a filament sometimes at the corolla, sometimes at the antheræ, so that it remained free at one or the other extremity, *p p*, and the rest were left entire. Immediately the filament stretched outward, and bent itself into a curve the opposite way, and remained so without returning to its former site; but being irritated by the touch, twisted itself in a wonderful manner when it was long and free; so that it resembled a worm.

You may cut off the whole floscule at one stroke, where the filaments are joined to the corolla, so that the corolla and the style are cut also; and then take off the corolla, and draw out the style, so that there will remain the turret of the antheræ, with filaments fixed to it at one end, and free at the other. In this case, if you touch them, you will have a lively image of those famous heads of the polypus, which moves its delicate arms about in so wonderful a manner, as represented in fig. *s*, although here is nothing but parts of the filaments. The shorter you cut the filament the less it moves; but yet it does move. If you cut it in half, both parts move equally; and immediately upon cutting both parts always contract.

All these experiments I think demonstrate a strong power of contraction; and moreover, that this power resides in the inward structure of the filaments, independently of their natural situation, and the composition of the whole mechanism of the floscule *o*. But this is proved more fully by a more delicate experiment. A filament being cut off as long as possible at both extremities, if you touch it, though entirely separated from the rest of the floscule, it will still twist, and even a small fragment will do the same.

Farther than this I pretend not to go: nor do microscopes lend any assistance; for they discover nothing but a gelatinous and clear substance, with certain fibres easy to separate longways, if you bruise the filaments. In the axis of every filament I thought I saw a substance of a different nature, like the pith in a branch; and if you look at the cut part of a filament there appears a white speck in the middle. It was of little consequence to observe those tender and transparent points, with which all the surface of the filament is armed, like what is seen on roses, but not all equal. These seen with the microscope resemble exactly the icicles that hang from the eaves of buildings in very cold winters. It is certain, however, that the filaments are extremely tender, pliable, and capable of stretching, when pulled out, to double their length, without breaking *x x*. Nay, after this violent operation they become shorter than ever, and visibly wrinkled even to the naked eye *y*. The microscope however shews them wrinkled at any age whenever they are contracted, and like worms when they contract themselves from fear.

We may conclude from hence, that a like wrinkling happens to them even when old, and when the floscules die off; because this experiment does not succeed so well in unripe filaments. In general, as has been already observed of the antheræ, the filaments are continually shortening, from the time the floscule is in a riper state to the last dry state. This natural and gradual contraction is well expressed by my above-mentioned friend, who designed these figures.

It is not easy to measure the duration of this contracting power. It remains longest in cool air; and these experiments are best performed by night. When the heat is great, they scarcely answer at all. The more the filaments are contracted by age, this power becomes weaker, and is totally lost when the stigma is emerged from the antheræ. What is there now remaining for a naturalist? what but a modest silence? As I can go no farther in search of causes, I must content myself with finding out names, and not lose this opportunity, perhaps not less curious than any other whatever, of concurring with many noble late discoverers, and of joining my obscurity with their lustre. Let me then call this contracting power *the Irritability of Flowers*, a quality perhaps never so fully shewn as here, unless in relation to the fibres of the muscles. A very fit name, provided it is used to signify only a power which the mechanical writers themselves do not pretend to understand. Of what consequence then is it that our floscules are not irritable, unless after a repose of three minutes? Who can say that something similar to this is not necessary in the muscular fibres? And lastly, may it not be said, that the filaments of flowers are muscles?

I am sensible of my good fortune in speaking before you, Gentlemen; and I cannot fail of making my advantage of it, by leaving to the judgment of this illustrious society of philosophers to pursue farther these nice disquisitions, where I find myself totally at a loss.

a b, An entire floscule taken from the flower, and seen with a microscope.

b, The germ and unripe fruit with its threads, upon which the style is fixed within the corolla *c*.

c, The place where the corolla grows wider, and where the floscule comes out of the calyx or cup.

d, Five points in which the corolla being divided terminates.

e, The place where the filaments are united to the five sides of the Gothic turret *e e*.

f, The filaments which in the immature floscule appear in part out of the corolla.

g, The first descent when the turret opens, and the farina issues out.

h, A farther descent of the turret of the antheræ, with the stigma out *h*, covered with the farina.

i i, The floscule, the corolla being taken off at *c*; so that the whole turret not quite open appears, and also the distaff with the five filaments *i i* naturally arched, and in the middle of them the style *k*.

l m n, another floscule with the turret open, and as low as it can go.

l, The stigma out, along with its collar of threads, and part of the style.

m, The filaments close to the style, and contracted as when they are fresh.

o p p, A similar floscule without the corolla, seen with a small magnifier with one single filament *o*, irritated, contracted, and drawn on one side.

p p, Two filaments, one cut off at top, the other at the bottom, which are left to twist freely.

q q r s, Another floscule dissected, the filaments being cut into two parts *r s*, and the style drawn out of the turret.

t, A floscule likewise without the corolla, in order to shew the accident of the dislocation of the style, with the five filaments contracted.

u u, A floscule without the style, extended in order to shew how much the filaments *x x* may be lengthened.

y, The same floscule let loose, which shrinks, with the filaments wrinkled.

THE

SWEDISH PAN;

OR,

INTRODUCTION

TO

OBSERVATIONS ON GRASSES.

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OBSERVATIONS ON GRASSES.

THE SWEDISH PAN.

By NICHOLAS HASSELGREN;

OR,

OBSERVATIONS ON THE DIFFERENT PLANTS SELECTED AS FOOD BY DIFFERENT ANNIMALS; CONCLUDED WITH A COMPARATIVE TABLE OF THE GRASSES.

Upsal, 1749, *Decemb.* 9.

(Amœnit. Academ. vol. II.)

THE antients attributed the pastoral life to Pan, the care of flowers to Flora, hunting to Diana, and the cultivation of grain to Ceres. We, though acknowledging only one Deity, who governs all things, yet often use these names to denote the subject on which we undertake to treat. What word is now more known among botanists than Flora; by which they mean all those plants growing within a certain compass of ground; as our Fauna Suecica takes in all those animals, which are natives of Sweden? For a like reason we have entitled this small tract the *Swedish Pan;* intending thereby to denote the five domestic quadrupeds, which live upon plants growing in Sweden; or the devouring army of Pan, which lays waste the provinces of the Swedish Flora. We chuse by this means to avoid a prolix definition, which is always disagreeable for the title of a book.

The pastoral life, by the testimony of both sacred and prophane history, is nearly as old as man himself; so that I would willingly derive the knowledge which I am going to deliver from the most antient times. But although plants have been constantly obvious to the eyes of every man, yet I am obliged to declare, that we have nothing delivered down to us in any book concerning the kinds of plants proper for the different kinds of cattle; so that I may be sure of not disgusting my reader with stale matter new dressed up. For the whole of what I present to him is new.

Our illustrious president, in his journey through Dalecarlia in 1734, made the first attempt this way, as may be seen Flor. Lapp. p. 158, where he says thus: "In my journey through Dalecarlia, when we had climbed up the mountains, and entered Norway, my fellow-travellers being tired, and asleep, I wandered about in a dismal wood, and perceived that the horses easily distinguished wholesome from noxious food; for, being very hungry, they devoured all sorts of plants, except the following: *meadow sweet*, *valerian*, *lilly of the valley*, *angelica*, *loose-strife*, *marsh-cinquefoil*, *crane's-bill*, *hellebore*, *monks-hood*, and many shrubs. This gave me a hint to recommend to the curious, that they would examine what plants such animals as live on vegetables, viz. the *cow*, the *sheep*, the *goat*, the *deer*, the *horse*, the *hog*, the *monkey*, and their species, will not touch. An examination which would not be without its use, were it properly made."

Notwithstanding this recommendation, no inquiry was undertaken till our President returned home from his travels through foreign countries, and made a progress in our own provinces. Afterwards professor Kalm, that worthy disciple of so great a master, followed his example; so that in his journey to Bahus we find mention made of some plants which cattle either eat or refuse. In 1747 and 1748 our President undertook with great diligence not only to make experiments himself, but to excite his disciples and auditors to do the same; of which number I was one. Thus at last many experiments were made, and repeated, especially by Hagstrom, Mag. Liidbeck, Ekelund, Wahlbom, Montin, Oldbers, Forskahl, and Fornander; not to mention others, who strove to outdo one another in finding the plants which were suitable to different animals.

The difficulty however of examining all the Swedish plants, and obtaining animals proper for experiments, which ought all to be repeated, has hindered us from giving a complete work on this subject. But the greater part, and the most common vegetables of Sweden, being now determined by us; what is wanting may be supplied from time to time. We hinted that animals proper for experiments, such as *cows*, *goats*, *sheep*, *horses*, and *swine*, are difficult to be found, for these reasons; first, because some plants are eaten by them in the spring, which they will not touch in summer, when apt to grow rank in taste and smell, and to become stalky and hard. Thus many people eat the *nettle* in the spring, but who could bear it afterwards? Again, because some kinds of animals eat the flower, and will not eat the stalks; others eat the leaves, and will not eat the stalks *. Next, the animals ought not to be over hungry when we make our experiments, if we intend to make them properly. For at such a time they will greedily devour most kinds of plants, which they will absolutely refuse at another. Thus when they come immediately out of the stall, they are not fit for experiments, for then they are ravenous after every green thing that comes in their way: The best method is to make the experiments when they are almost full, for they are hardly ever so entirely. Moreover, the plants ought not to be handled by moist hands; some animals will refuse the most pleasing and tasteful in that case. We ought to throw them on the ground, and if we find the animal refuses to eat them, we must mix them with others which we know they like; and if they still refuse them, we have a sure proof; especially if the same be tried with many individuals.

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* When they eat the leaves, we say in general they eat the plant, otherwise there would be few grasses they could be said to eat, Œcon. Nat.

Our views do not extend beyond the Swedish plants, and that for the sake of our own œconomy. Let foreigners look to that part which concerns themselves, and thus our work will be confined within moderate bounds. We can produce above 2000 certain experiments, some of which were repeated ten times, some twice as often. If we take the Flora Suecica Holm. 1745, and put to any herb the generical name, adding the number, and some epithet by way of difference, our work will be very much abridged.

It is manifest that the vegetable world was intended for the support of the animal world; insomuch that although not a few animals are carnivorous, yet the animals which they devour cannot subsist without vegetables. In this speculation we behold with admiration the wisdom of the Creator, who has made some vegetables absolutely disagreeable to some animals that live upon plants, while these plants are agreeable to others. And there are plants, which are poisonous to some animals, which are very wholesome to others, and on the contrary.

This did not happen by chance, but was contrived for wise purposes. For if the Author of nature had made all plants equally grateful to all kinds of quadrupeds, it must have happened, that one species being remarkably increased, another species must have perished with hunger, before it could have got into better pasture; the vegetables being spread over a large tract of ground But as it is ordained, every species must leave certain plants to certain animals, so that they always find something for food, till they meet with better pasture. In the like manner we find it contrived in relation to the plants themselves, which do not all grow in the same country and climate; but every plant has its place appointed by the Creator, in which it grows more abundantly than elsewhere. Hence we may observe, that those animals which chiefly live upon particular plants, chiefly abound in certain places. Thus the *lichen* or *liverwort*, Fl. 980, is found in greatest plenty on the cold Alps, and therefore the *rhen deer*, which in winter feed mostly upon this plant, are obliged to live there. The festuca, Fl. 94. which flourishes and spreads most on dry pastures, draws the sheep thither, which above all things delight in that kind of grass. The seeds of the *dwarf-birch*, Fl. 777, which afford the best sort of food to the *rough-legged partridge*, and the *Norway rat*, Fn. 26, tempt them to dwell in these northern parts of the world. *Camels hay*, Mat. Med. 312, which above all plants, thrives on loose sand, draws the camel to choose those barren places, as they there find food most agreeable to them; not to mention many other similar instances. Trees, whose heads shoot up so high, that quadrupeds cannot easily reach them, afford nourishment for that reason to more numerous tribes of insects, as the *sallow*, the *oak*, the *pear*, &c.

The Creator, who most wisely established this law, has as it were imprinted it on the organs of animals, that they might not offend against it through ignorance; and as every transgression has its punishment allotted, so also no offence against the law of nature can escape. Animals, which violate this law, are punished by diseases or death; and hence we behold with admiration that brutes which were designed to be guided by instinct cannot be prevailed upon to act against it. If by chance any animal offends this way, and suffers for it, we vulgarly say it has taken poison; so that ignorant people wonder, not to say murmur, at the wise disposition of the Creator, who has produced so many noxious plants; though without sufficient reason: for no one plant in the world is universally poisonous; but all things are good, as they came from the hands of the Creator.

Physicians often mention that this or that plant is deadly, because its particles are of a nature apt to wound the fibres of the body, or corrupt the juices. But this is only respectively to the species of animals:

for instance, the *sun-spurge*, Fl. 536, has a milky juice, which causes blotches in our skin, and hurts our fibres, and therefore it is said to be poisonous: yet the *moth*, Fn. 825, almost entirely lives upon this plant, and prefers it both for taste and nourishment to all others. Thus one animal leaves that, which to itself is poisonous, to another animal, which feeds upon it deliciously. *Long-leaved water hemlock* will kill a *cow*, whereas the *goat* browses upon it greedily. *Monks-hood* kills a *goat*, but will not hurt a *horse*; and the *bitter almond* kills a *dog*, but is wholesome food for *man*. *Parsley* is deadly to *small birds*, while *swine* eat it safely; and *pepper* is mortal to *swine*, and wholesome to *poultry*. *Thus every creature has its allotted portion.*

Animals distinguish the noxious from the salutary by smell and taste. Younger animals have these senses more acute, and therefore are more nice in distinguishing plants. An empty stomach will often drive animals to feed upon plants that were not intended for them by nature. But whenever this has happened, they become more cautious for the future, and acquire a certain kind of experience; *e. g. the monks-hood*, which grows near Fahluna, is generally left untouched by all the animals that are accustomed to these places; but if foreign cattle are brought thither and meet with this vegetable, they venture to take too large a quantity of it, and are killed *,

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* The same thing has been told me by the country people in Herefordshire in relation to *meadow-saffron*, which grows in plenty

The cattle that have been reared in the plains of Scania and Westrogothia, commonly fall into a dysentery when they come into the woodland parts, because they feed upon some plants, which cattle used to those places have learned to avoid. In the spring, when the *water hemlock* is under water, so that the cows cannot smell it, they die in heaps *. But when the summer has dried the ground, they are very careful not to touch

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in some parts of that county. Gmelin, Fl. Sibirica, p. 76, says that cattle eat the leaves of the *hellebore*, 40, when they first spring out of the ground, and are thereby killed.

* This affair is of so much consequence to the farmer, that I think it right to transcribe a passage out of Linnæus upon this subject.

"When I arrived," says he, "at Tornea, the inhabitants complained of a terrible disease, that raged among the horned cattle, which upon being let into the pastures in the spring, died by hundreds. They desired that I would consider this affair, and give my advice what was to be done, in order to put a stop to this evil. After a proper examination, I thought the following circumstances worth observing.

1. The cattle died as soon as they left off their winter fodder, and returned to grazing.

2. The disease diminished as the summer came on, at which time, as well as in the autumn, few died.

3. This distemper was propagated irregularly, and not by contagion.

4. In the spring the cows were driven into a meadow near the city, and they chiefly died there.

5. The symptoms varied much, yet agreed in this, that the cattle, upon grazing indiscriminately on all sorts of herbs, had their bellies swelled, were seized with convulsions, and in a few days expired with horrible bellowings.

it. It is also true, that all vegetables prohibited by nature to particular animals are not equally pernicious; and therefore though through necessity and hunger they eat them, yet they do not immediately die; but it is certain that they cannot have from thence good and proper nourishment.

6. No man dared to flay the recent carcases, as they found by experience, that not only the hands of such as attempted it, but their faces too had been inflamed, and mortified, and that death had ensued.

7. The people enquired of me, whether there were any kinds of poisonous spiders in that meadow, or whether the water which had a yellowish tint was not noxious.

8. It was not a murrain, was clear, because the distemper was not contagious, and because that distemper is not peculiar to the spring. I saw no spiders but what are common all over Sweden; and as to the water, the sediment at the bottom, that caused the yellowness, was nothing but what came from iron.

9. I was scarcely got out of the boat, which carried me over the river into the meadow, before I guessed the real cause of the disease. For I there beheld the *long-leaved water hemlock.* My reasons for guessing this were as follow.

10. Because in that meadow, where the cattle first fell ill, this poisonous plant grows in great plenty, chiefly near the banks of the river. In other places it was scarce.

11. The least attention will convince us that brutes shun whatever is hurtful to them, and distinguish poisonous plants from salutary by natural instinct: so that this plant is not eat by them in the summer and autumn, which is the reason that in those seasons few cattle die, viz. only such as either accidentally, or pressed by extreme hunger, eat of it.

12. But when they are let into the pastures in spring, partly from their greediness after fresh herbs, and partly from the emptiness and

The end of this kind of knowledge is not bare curiosity, although were this the case every part of knowledge, which sets forth the stupendous works of the Creator, is never to be looked upon as of no consequence. On the other hand, we do not pretend to gain any medicinal advantages from these speculations, namely, to be able from hence to conclude, that this or that plant is noxious to man, because it is so to this or that brute animal. Nor do we for that reason approve of Wepfer's experiments upon dogs, and other animals, as if any

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hunger which they have undergone during a long winter, they devour every green thing which comes in their way. It happens moreover that herbs at this time are small, and scarcely supply food in sufficient quantity. They are besides more juicy, are covered with water, and smell less strong, so that what is noxious is not easily discerned from what is wholesome. I observed likewise, that the radical leaves were always bitten, the others not; which confirms what I have just said.

13. I saw this plant in an adjoining meadow mowed along with grass for winter fodder; and therefore it is not wonderful, that some cattle, though but a few, should die of it in winter.

14. After I left Tornea I saw no more of this plant till I came to the vast meadows near Limmengen, where it appeared along the road, and when I got into the town I heard the same complaints as at Tornea, of the annual loss of cattle, with the same circumstances.

15. It would therefore be worth while to eradicate carefully these plants, which might easily be done, as they grow in marshy grounds; and are not hard to find, as they grow by the sides of pools or rivers. Or if this could not be done, the cattle should not be suffered to go into such places, at least during the spring. For I am persuaded, that later in the year they can distinguish this plant by the smell alone.

knowledge can be thence gained in regard to man. No, the end we aim at is merely œconomical.

1. From these experiments we may know whether certain pastures afford good nourishment for this or that species of animals. We see *heifers* waste away in enclosures, where the *meadow-sweet* grows in abundance, and covers the ground so that they can scarce make their way through it; the country people are amazed, and imagine that the pasture is too rich for them; not dreaming that the *meadow-sweet* affords them no nourishment. Whereas the *goat*, which is bleating on the other side of the hedge, is not suffered to go in, though he longs to be browsing upon this plant, which to him is a most delicate and nourishing food *.

2. From these experiments we may almost be sure by affinity and analogy, whether meadows or pastures are salutary or noxious to particular animals; for example, long experience has taught us that our sheep take up poison in marshy grounds, though no one till lately knew what was the particular poison. Yet the *spiderwort* 267, the *mouse-ear scorpion grass* 149, the *mercury* 823, the *sun-dew* 257,8, the *hairy wood grass* 287, the *lesser spearwort* 458, the *butter-wort* 21, have evidently sus-

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* See a sensible article on "The Extirpation of Plants noxious to Cattle on Dairy and Grazing Farms, and the Cultivation of such as are wholesome and nutritious, recommended; by Mr. Benjamin Axford;" Transactions of the Bath Agricultural Society, vol. I.

picious marks *. I will therefore propose a new experiment. The *andromeda* Fl. Virgin. 160, is known to be a most rank poison to sheep in Virginia. The *andromeda,* called by the people of New York *dwarf laurel,* Cold. Act. Upsal. 1743, p. 123, is very fatal to the sheep in New York. These two plants are of a different species, but of the same natural genus, and therefore have the same virtues. Amongst us, especially in the Northern parts, the wild *rosemary, andromeda* 335, grows every where in marshy grounds, which being of the same natural genus with the foregoing, we may reasonably conclude that it destroys our sheep. To this we may add, that it is on account of three other species of *andromeda* 336,7,8, which grow on the Lapland mountains, that the sheep there never are healthy; and lastly although the *cistus ledon* 341 is not a species of *andromeda,* yet, being of the same natural class, it is not unlikely but that this plant is far from affording good nourishment to sheep. This conjecture gives our shepherds an unexpected opportunity of making experiments with their sheep; and indeed they cannot omit to do it without being justly blameable, since on this the health of their whole flock depends. It is particularly to be noted upon this occasion, that the botany of America, a country so far disjoined from us, gives a hint for considering things of the greatest use, of which the antients did not so much as dream.

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* There is great reason to think, that what makes low grounds so noxious to sheep is not the moisture, but the plants that grow there. For it is observed by shepherds that the great danger to sheep is immediately after a fresh spring of grass, which I imagine is owing to their licking up the young and tender shoots of poisonous plants along with their proper food, not being able to distinguish them.

3. From hence the œconomist may truly judge of his meadows, and know that some are vastly preferable to others for certain animals. For although cattle, pressed by necessity and hunger, will feed upon vegetables less grateful to them; yet it is not to be doubted but that they are not equally nourished by these as by others. Thus the Dalecarlians are obliged in a scarcity of wheat to support themselves by *bread* made of the *bark* of the *pine*, yet it does by no means follow from hence that this affords proper nourishment. We see that *horses* in time of war, when pressed by extreme hunger, will eat *dead hedges*, but we cannot hence conclude that wood is good food for them.

4. The industrious farmer may judge from hence, when he sows his meadows with hay seeds for pasture, that it is not indifferent what kinds of seeds he chooses, as the vulgar think. For some are fit for *horses*, others for *cows*, &c. *Horses* are nicer in choosing than any of our cattle; *siliquose* and *siliculose* plants particularly are not relished by them. *Goats* feed upon a greater variety of plants than any other cattle; but they chiefly hunt after the extremities and flowers. *Sheep*, on the contrary, pass by the flowers, and eat the leaves. Not to mention the different disposition in different animals as to grazing near the ground or not. The countryman who understands these things, and knows how in con-

sequence to dispose of his grounds, and assign each kind of cattle to its properest food, must necessarily have them more healthy and fat than he who is destitute of these principles. The good œconomist will observe the same of his hay. For although many herbs, when dry, are eaten, which when green would be refused, it does not follow from hence that they yield good nourishment. Much might be added concerning the propensity of cattle to this or that plant, which the compass of this small tract will not admit of; for instance, that *sheep* above all things delight in the *festuca* 95, and grow fatter upon it than any other kind of grass; that *goats* prefer certain plants, but being led by an instinct peculiar to themselves, they search more after variety, and do not long willingly stick to any one kind of food whatever; that *geese* are particularly fond of the seeds of the *festuca*, Fl. 90; that *swine* greedily hunt after the roots of the *bull-rush* 40, while they are fresh, but will not touch them when dry. Hence it appears, that it is in vain to contrive engines to extract the roots of the *bull-rush* out of the water, and dry them for the use of these animals in winter. Because these animals spoil the meadows where the *scorzonera* grows, in order to come at its root, which they delight in; and also the fields, to get at the roots of *clowns-all-heal*, the husbandman imagines they do good to his fields by ploughing the ground and eating the roots of *couch-grass*, whereas they never touch them, but when pressed by the utmost necessity *.

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* In the same way with us it is a common notion that *cows* eat the *crow-foot* which abounds in many meadows, and that

To give a view of my design in a few words. I have disposed the plants mentioned in the Flora Suecica according to their numbers; and, to be as short as possible, it was necessary to add the generical name with a short and incomplete epithet, which however may be illustrated out of the Flora itself. I have distinguished the cattle against every plant into five columns. The first of which contains *oxen*. The second *goats*. The third *sheep*. The fourth *horses*. The fifth *swine*. By the mark (1) I have denoted those plants which are eaten; by the mark (0) those which are not eaten; by both together those which are sometimes eaten, sometimes refused; or are eaten when cattle are more used to them, and are more hungry; otherwise not.

Upon the first view of this subject the reader will perceive, that it is not treated completely, so that every

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this occasions the butter to be yellow, from whence I suppose it is generally known by the name of the *butter-flower*. But this I believe is all a mistake, for I never could observe that any part of that plant was touched by *cows* or any other cattle. Thus Linnæus observes, Fl. Lapp. p. 195, that it was believed by some people that the *marsh-marygold* made the butter yellow, but he denies that cows ever touch that plant. Yet he thinks that all kinds of pasture will not give that yellowness; and then observes that the best and yellowest butter he knows, and which is preferred by the dealers in those parts to all other butter, was made where the *cow-wheat* grew in greater plenty than he ever saw any where else. This shews how very incurious the country people are in relation to things with which they are every day conversant, and which it concerns them so much to know.

Swedish plant is pointed out, and by what animals it is eaten. What generally happens upon breaking up old pasture-lands, *viz.* that for the first years it cannot be cleansed from all useless weeds, and be laid down fine like a garden, but will here and there have rough tumps and hard clods, unless we will let it lie fallow for a very long time; the same, or something like it, has happened upon this occasion.

I am apt to believe, however, that the reader will be better pleased that I have opened this new scene, than if I had waited longer in order to gain farther light. For since there are many people here curious in botany and œconomy, I hope they will all lend a helping hand, that I may one day be enabled to give a more complete edition of this piece[*].

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[*] After this in the original follows a long table of experiments, of which I shall only give a small specimen; as the whole would increase the bulk but not the value of this piece to readers for whom this translation is intended; since they would neither know the plants by the names the author has given them, nor by any I could put in their room. However, I shall for curiosity give a specimen, and add the general result of his experiments; just as he has marked it at the end of his table; which is as follows: “Thus far,” says he, “we have given 2314 experiments; from these it appears that

Oxen	eat	276	refuse	213	plants.
Goats		449		126	
Sheep		387		141	
Horses		262		212	
Swine		72		171	

And thus these animals leave untouched 868 plants.
These animals will not eat any kind of *moss*.
The goats are very fond of the *algæ*.
Some of them greedily devour the *fungi*, others will not taste them.
But we recommend farther trials in relation to these matters.”

Then follows an account of some trials made by Dr. Hagstrom to the same purpose in relation to *rhen deer*, but, as they no ways concern us, I have omitted to mention them.

N. B. For the table I have chosen not to take such plants as occurred first in my author, but to select the grasses of our own country, and have given English names to them of my own invention, the reason of which will appear in the following observations.

	Oxen	Goats	Sheep	Horses	Swine
Spring grass	1	1	1	1	-
Mat grass	10	1	1	1	0
Canary grass, *reed*	1	1	1	1	0
Cat's-tail, *meadow*	1	1	0	1	0
Fox-tail, *meadow*	10	1	1	1	10
———— *flote*	1	1	1	1	0
Millet grass	1	1	1	-	-
Bent grass, *silky*	-	1	0	1	-
———— *fine*	1	1	-	1	-
Hair grass, *small-leaved*	1	1	1	1	-
———— *water*	1	-	1	1	-
Meadow, *creeping*	1	1	1	1	0
———— *annual*	1	1	1	1	1
———— *great*	1	1	1	1	1
———— *narrow-leaved*	1	1	1	1	1
———— *common*	1	1	1	1	1
Cock's-foot grass, *rough*	0	1	1	1	0
Dog's-tail grass, *crested*	-	-	1	-	-
———— *blue*	-	1	1	1	0
Fescue grass, *flote*	0	1	1	1	10
———— *purple*	1	1	1	1	-
———— *sheep's*	1	1	11	1	-
Brome grass, *field*	1	1	1	1	-
———— *spiked*	-	1	1	1	-
Oat grass, *meadow*	1	1	1	1	-
———— *bearded*	-	10	-	-	-

BIBLIOTHECA BODLEIANA

OBSERVATIONS

ON

GRASSES.

OBSERVATIONS ON GRASSES.

SECTION I.

On the prevalent method of laying down to grass. Directions for gathering seeds fit for that purpose.

As the Swedish Pan contains some observations on grasses * that are quite new, and as this affair is of the utmost importance to the husbandman, I shall subjoin some observations of my own relating to the same subject.

It is wonderful to see how long mankind have neglected to make a proper advantage of plants which in almost every country are the chief food of cattle. The farmer, for want of distinguishing and selecting good seed, fills his pastures with weeds, and bad or improper grasses; when, by making a right choice, after some trials he might be sure of the best grass, and in the greatest abundance that his land admits. At present, if a farmer wants to lay down his land to grass, what does he do? he either takes his seeds indiscriminately from his own foul hay-rick, or sends to his next neighbour for a supply. By this means, besides a certain mixture of all sorts of rubbish, which must necessarily happen; if he chances to have a large proportion of good seeds, it is not unlikely that what he intends for dry land may come from moist where it grew naturally, and the contrary.

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* By grasses are meant all those plants, which have a round, jointed and hollow stem, surrounded at each joint with a single leaf, long, narrow and pointed, and whose seeds are contained in chaffy husks. It appears by this definition, which is Ray's, that all the kinds of grain, as wheat, oats, barley, &c. are properly grasses, and that the broad, the white, the hop, &c. clovers are not grasses, though so frequently called by that name.

I have had several opportunities of observing instances of this slovenly kind of husbandry, and its effects. Instead of covering the ground in one year with a good turf, I have seen it filled with weeds not natural to it, and which never would have sprung up, if they had not been brought there.

Arguments are never wanting in support of antient customs, and I am no stranger to the arguments, such as they are, which prejudice and indolence have made use of on this occasion.

1. Some say, that if you manure your ground properly, good grasses will come of themselves. I own they will. But the question is how long it will be before that happens, and why be at the expence of sowing

what you must afterwards try to kill by manuring? which must be the case, as long as people sow all kinds of rubbish under the name of hay seeds. Again, if the best way is to let the ground take its chance, why is the farmer at the expence of procuring the seeds of the white, and broad clover, which come up in almost all parts of England spontaneously? But if this is allowed to be the best way in relation to clover of any kind, what reason can be in nature, why grass seeds only ought not to be sown pure?

2. Others say, that it is better to have a mixture of different seeds. I will suppose this to be true. But cannot a mixture be had though the seeds be gathered, and separated; and is not a mixture by choice more likely to be proper, than one by chance? especially after sufficient experience of the particular virtues of each sort, the different kinds of cattle each grass is most adapted to, the different grounds where they will thrive best, &c. all which circumstances are now in general wholly unknown, though of the utmost consequence.

3. It is said by some, that weeds will come up along with the grass. No doubt of it. Can any one imagine that grass seeds should be exempted from what happens to every other kind of seed. But I will venture to say that a far less quantity of weeds will spring up than they imagine, if it be sown very thick. Men must be very much pressed when they make such objections. I am

almost inclined to say with a great writer, "It is a simple thing to take much pains to answer simple objections."

This might appear too slovenly a method of proceeding, to prevail universally; yet this is the case as to all grasses except the darnel, and what is known in some few counties by the name of the Suffolk grass; and this latter instance is owing, I believe, more to the soil than any care of the husbandman. Now, would the farmer be at the pains of separating once in his life half a pint or a pint of the different kinds of grass seeds, and take care to sow them separately; in a very little time he would have wherewithal to stock his farm properly, according to the nature of each soil, and might spread these seeds separately over the nation by supplying the seed shops. The number of grasses fit for the farmer is, I believe, small; perhaps half a dozen, or half a score, are all he need to cultivate, and how small the trouble would be of such a task, and how great the benefit, must be obvious to every one at first sight.

Would not any one be looked on as wild who should sow wheat, barley, oats, rye, pease, beans, vetches, buck-wheat, turnips, and weeds of all sorts together? yet how is it much less absurd to do the same thing in relation to grasses? Does it not import the farmer to have good hay and grass in plenty? and will cattle thrive equally on all sorts of food? we know the contrary; for horses will scarcely eat hay that will satisfy oxen and cows. Sheep are particularly fond of one kind of grass, and fatten on it faster than on any other in Sweden, if we may give credit to Linnæus. And may they not do the same in England? how shall we know till we have tried? Nor can we say that what is valuable in Sweden may be inferior to many other grasses in England; since it appears by the Flora Suecica, that they have all the good ones which we have. But however this may be, I should rather choose to make experiments than conjectures.

The grasses which I recommend as most profitable, are the following:

The *Vernal*, the *Meadow Fox-tail*, the *Mountain Hair*, the *Annual*, *Common*, and *Great Poas*, the *Meadow* and *Sheep's Fescue*, the *Yellow Oat*, and *Crested Dog's-tail*, and *Fine Bent*. Of these the *Fine Bent* and *Crested Dog's-tail* seem to me to be most worth gathering; as they afford excellent pasture for horses, oxen, sheep, and deer, suit almost every kind of soil, and yield a large quantity of very good hay.

Next to these I should reckon the *vernal*, for most of the reasons above given, and also because it springs early. After this, in my opinion, comes the *sheep's fescue*, as being so excellent for all high, dry, and warm lands proper for sheep. Then follows the *yellow oat*, as being proper for loamy lands, where sand predominates, and not improper for richer grounds. I

I place the *fox-tail* and *poas* after these, because, though they afford perhaps the finest pasture and hay of all grasses, yet they will not, I believe, remain long on any ground that is not extremely rich, such as is found about London.

The present way of laying down to grass is so manifestly absurd, that I need not enlarge on the importance of gathering clean seeds *, and cultivating them in such a manner that each kind, according to the discretion of the farmer, may be produced at a reasonable price. I shall therefore proceed to give a few hints relative to the mode of gathering which I would recommend.

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* See some sensible remarks on the execrable mode of using hay-seeds, without proper selection, in Marshall's Rural Economy of Gloucestershire. "Hay-seeds," he says, "is an indefinite term. Seeds collected from hay of a well herbaged ground, cut young, shook or threshed upon a floor and sifted through fine sieves, to exclude the large seeds of weeds with which all old grass-lands abound, might be eligible, provided still purer seeds cannot be had. But what is generally thrown upon land under the denomination of *hay-seeds*, is a collection of the seeds of the rankest weeds, with few or none of those of the finer grasses." After mentioning the improvements in some pastures by the first method, he adds, "On the contrary, I have had opportunities of observing several instances of lands which have been laid down with hay-seeds, and which as at present lie a disgrace to English agriculture." Marshall's Rural Economy for vale of Gloucester, vol. I. p. 160. The Rev. Mr. Swayne also sent a well-digested article on this subject, with specimens of grass seeds, to the Bath Society; to which we refer the curious Reader as containing much wholesome advice on this important part of rural economy, vol. I. p. 76. The grasses from which he collected the seeds, were the Annual, great and common Poas, the Vernal, Meadow Fox-tail, and Flote Fescue.

I have made frequent experiments how easy it is to gather the seeds of grasses, having often employed children of ten or eleven years old, who collected many sorts without a mistake, after I had once shewn them those which I wanted. I thus procured sufficient quantities of several species to begin a stock.

In 1761 a little boy by my directions gathered as much of the *crested dog's-tail* in three hours, by the side of a road, as, when shed, yielded above a quarter of a pound avoirdupois weight, free from husks. As this seed is small, the skilful will easily judge how far a quantity would go if properly managed.

My very estimable and ingenious friend Mr. Aldworth *, who was witness of the fact which I last mentioned, at my desire, ordered a part of a meadow, near his seat at Stanlake, which had better grasses and less mixed than the rest, to be left unmowed till the seeds were fit for gathering. This piece yielded upon threshing and sifting, a full bushel by measure of almost pure seed of the *crested dog's-tail.* In case any one should be inclined to follow his example, I think it highly necessary to observe, that care must be taken to mow the grass before it sheds; that it be mowed early in the morning before the dew is off the ground, and that it ought not to be spread as in making hay, but left as it falls from the scythe a sufficient time, and then just turned over.

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* Afterwards Mr. Neville.

On the 2nd of August 1763, I began to employ, in Yorkshire, several children about eleven or twelve years old to gather the *crested dog's-tail.* I gave to each of them three-pence a day. In four days, two of which were so rainy that they could not work above half the day, they gathered as much as yielded by rubbing and threshing two pecks and a half, full measure, of perfectly clean seed. The whole expence was seven shillings. This quantity is more than sufficient by the judgment of three different farmers, eminent for their skill, to sow an acre of land. The farmers in the parish where this seed was gathered, are obliged by lease, when they lay down, to sow twenty-four bushels an acre of hay seeds, which cost six pence a bushel at Hull, whither it is brought from Durham. So that the expence is twelve shillings an acre, to lay down with the vilest trash I ever saw. I have now a specimen, in which, what little seed there is, is the soft grass, the very worst I suppose that comes out of the ground, except the hard grass and couch. I had afterwards a peck of the same *dog's-tail* seed, quite pure, gathered in one day by some children, which cost me 27 pence. N. B. I sowed some of this seed August 22, which came up September 1.

It appears by the foregoing account, which is taken from my journal, that the pure seed of the *dog's-tail* picked by hand costs less for the same quantity of land than the foul hay seeds, even at 3*d.* a day to each child, which is one half more than I might have paid.

But then we ought not to suppose, even if every kind of grass, in every place, were as easy to gather as the dog's-tail, that we can find children enough in many places to collect a sufficient quantity of seed in one year to sow a large piece of ground. For, supposing that eleven children can gather enough in one day to sow half an acre, there being not above a month's time to gather most sorts of seed, the whole quantity will amount to no more than what will serve for about fifteen acres, even taking the favourable account of two pecks an acre, which perhaps may be found too little.

On Aug. 16, 1763, I began to employ children to gather the *fine bent*. They gathered as much as yielded eleven pints, which cost me 12*s*. at 3*d*. a day, to each child. In the opinion of two farmers, a gallon of this seed will go as far as two gallons or a peck of the *dog's-tail*. Supposing this to be the case, the *bent* will cost about four times as much as the dog's-tail, if the bent be as difficult to gather in other places as where I was; but I believe that is not the case.

Aug. 23, 1763. Another grown person and myself, with two children, gathered five pints of the seed of the *meadow fescue*, between the hours of ten in the morning and two in the afternoon, though we went over a great deal of ground. I will suppose that the two children could have gathered as much at least by themselves during the whole day. In that case, the five pints would have cost six-pence. I will suppose again, that four pecks of this seed would be necessary to sow an acre, as the seed takes up much more room than the *dog's-tail.* Then it will cost only near seven shillings to sow an acre with pure seed picked by hand.

September 14. Eight children, in one day, gathered as much of the *meadow cat's-tail* as yielded one bushel and nine pints not cleared from the husks. If it had been cleared, I question whether it would have measured nine pints. I do not consider this among the profitable grasses. I was tempted to gather it for trial, as it was more plentiful than I had observed in other places. If it should prove otherwise, it appears that this will come cheap; for the seed, when perfectly cleaned, is so small, that I imagine it will go as far as the fine bent. In this case an acre may be sown for four shillings. N.B. This is what is called *Timothy grass*, lately brought from New England, as I am assured by a skilful botanist, who has raised it from the seed.

I had some of the *yellow oat* gathered; but, as the quantity was not great, I did not think it worth while to measure it, or note down what it cost me. It takes up a great deal of room, and therefore I cannot guess how much an acre will require.

In former years I have had, besides these, several other kinds of grasses, gathered in Norfolk, Berkshire, and Herefordshire: as the *sheep's fescue*, the *vernal*, the *hard fescue*, the *poa's* or meadow grasses, and the *fox-tail*, some in greater, some in less quantities; and, though I did not keep an account, yet, by conjecture, I think the difficulty and expence of gathering them would not be greater than those I gathered in Yorkshire, except the *poas*. In the expence of laying down in the common way the carriage ought to be considered; *viz*. Thirty acres will require seven hundred and twenty bushels of hay-seeds, whereas fifteen bushels of *dog's-tail* are sufficient.

I gathered as much seed of the *poa trivialis* at Merton as measured a quart and one-eighth, and weighed a full half-pound. It cost me 2*s*. 6*d*. paying above double what I ought to have done. At this rate an acre might be sowed for 10*s*.

I had eleven pints of the *fine bent* seed gathered August 16, at Waghen, in Yorkshire, which cost me 12*s*. The seed of this is much harder to gather than that of the *dog's-tail*, the stems being lower than the other grasses; but the seed is so much smaller, that a gallon will go at least as far as a peck of the *dog's-tail*. They lay in Holderness twenty-four bushels of seed *per* acre from the hay-loft, as obliged by lease; and give 2*s*. 6*d*. a coomb (equal to four bushels), which comes to 15 *l*.

Nine pints and a half of the *dog's-tail*, gathered in one day by nine children without threshing, and six and a half by threshing, so that the whole is 2*s*. 6*d*. a peck. *N. B.* I gave 3*d*. a day to each child. Two pecks of this would be enough for an acre; and consequently to lay down an acre would only cost 15*s.*

To the expence of gathering and dressing one hundred and sixty pounds of *crested dog's-tail* grass-seed, four pence halfpenny *per* pound, 3*l.* 0*s.* 4*d.* To the expence of gathering twenty pounds of fine *bent-grass* seed, fourteen pence halfpenny *per* pound, 1*l.* 4*s.* 2*d.* This quantity is sufficient for ten acres; or, eight shillings and five pence farthing *per* acre.

In sowing from the hay-loft, twenty-four bushels *per* acre are required, which, at six-pence *per* bushel, make 6*l.* for ten acres, or 12*s. per* acre.

Sixteen pounds of *dog's-tail*, and two pounds of *fine bent*, are required *per* acre. Also a bushel of *rye-grass* and six pounds of *white clover.*

The sale of grass seeds is become a trade at Yarum in Yorkshire: the price is one shilling *per* bushel. After threshing, the hay is good for young cattle and idle horses. There are three ways of sowing grass-seeds: 1. In August: 2. With barley, which is most used: 3. With rye or wheat in March. The first way is the best; and the second better than the last. The quantity usually sown is twelve bushels *per* acre; four pounds of hop or white clover; and some add two pounds of rye-grass. After the crop is cut they fence, and admit no cattle till the next hay-harvest, when it may be either mowed or fed; but there is danger from the cattle, if fed. The farmers generally mow the first crop for the seeds, which will afford more than afterwards. They roll as soon as the barley is cut; lay the dung after taking the first crop; and prepare the land with lime.

At Woodmanston in Surrey, June 24th, 1765, I counted 420 seeds in one single ear of the *poa trivialis*, or common meadow grass, which was not remarkably large. At Merton in Surrey, in the same month and year, I counted on one single root of the same grass, twenty flowering stems, and near forty radical leaves; suppose the ears of these, one with another, to contain three hundred seeds, then the produce would be six thousand seeds from one stem. At the same place and year, June 29, I counted in one ear of the said grass four hundred and thirty seeds. Four quarts, wine measure, of the *poa trivialis* seed, pure, weighed two pounds Avoirdupois, gathered at Woodmanston June 1765. A pint, wine measure, of the *poa annua*, or *annual meadow grass*, weighed something more than a quarter of a pound, gathered at the same time and place.

It remains, however, to be considered, what difference in the reward for the different seeds may be proper; because some are found in greater plenty than others, some are easier cleared from the husks, and some will go farther, as being much smaller. Thus the *crested dog's-tail* and *fine bent* are plentiful in most counties. The *dog's-tail* is gathered easier than the *bent*;

but then, perhaps, a gallon of the *bent* will go as far as a peck of the *dog's-tail*. The *vernal* is easily gathered; but very difficult to be cleared, on account of its crooked awn. The *fox-tail* is found in plenty about London, and in some other places, and is readily cleared by mere stripping; but then it must be watched, for almost as soon as it is fit to strip, it drops its seeds *. The *sheep's fescue* is found only on dry sheep-pastures, and a good deal of ground must be gone over to get any great quantity of its seed; but when found it is extremely easy to gather, and strip clear at once. The *yellow oat* is in some places very common, and easily gathered; but then it takes up much room, so that I suppose a peck of it would not go so far as a gallon of the *dog's-tail*. The *poas*, or meadow grasses, are perhaps the most difficult of all to gather, as they are very scarce in most places; and where plentiful, as about London, it is difficult to obtain ripe seeds. Hence they deserve the greatest reward, particularly the *annual meadow grass*, of which I never could get any quantity, as this ripens very unequally, not only in different plants, but in the same plant, and even the same ear. What I have gathered ripe I always found growing in the shade. I wish some one would discover the right method of gathering this seed, as it would be very acceptable to many people for rich lawns about a house; for this grass throws out roots at its joints, and therefore rolling must make it spread extremely, and grow thick and matted. The *turfy hair* grass is not difficult to find, or to gather.

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* A decisive experiment made with *fox-tail*, by Mr. Majendie, is recorded in Mr. Young's "Annals of Agriculture." M.

Secondly, With regard to the quantity of reward which ought to be offered, I will not pretend to give my opinion. I will only observe, that perhaps the choice of an honorary medal, or of money, according to the inclination of the gatherer, might not be improper. I mention this, because, upon talking with an ingenious farmer, who is zealous in this affair, he told me that he should not dislike to put in for the medal, but would not be a candidate for money. I will add, that it seems right to offer the reward for weight, and not measure; and to give no reward for mixed seeds; for the first and principal object ought to be to obtain a sufficient quantity of clean seeds for a crop. When that is done, the interest of the farmer will lead him to the rest.

Thirdly, I think specimens of the different kinds of grasses required should be advertised as ready for delivery to any person who might desire them. I know from experience that an ear of almost every one of them is sufficient to instruct the most ignorant person; having never found any of the children I employed make a mistake, after being once shewn an ear of the grass which I wanted, except in one sort, *viz.* the *fine bent*, which is very like the *marsh bent.* But this error may be prevented, by requiring that the *fine bent* be gathered on dry and high land; and observing, that though the ignorant cannot, yet the skilful can, distinguish it from the *marsh bent;* and therefore those who do not conform to the condition prescribed will certainly lose the premium *.

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* It is very singular that, notwithstanding the sensible observations and decisive experiments of Mr. Stillingfleet, supported by the recommendations of the most judicious agriculturists, and the premiums offered by the Society for the encouragement of Arts, that lawns and pastures are in general still laid down to grass in the same slovenly and injudicious manner as formerly.

We are not without hopes that this injudicious practice will be eradicated in time; and we consider, as one of the most effectual means for promoting this purpose, the exertions of the late Mr. William Curtis, author of "The Flora Londinensis." We learn that he selected packets of the most approved seeds for the use of agriculturists. The six kinds which have particularly employed his attention are the *Sweet Scented Vernal*, *Meadow Fox-tail*, *Smooth Stalked Meadow*, *Rough Stalked Meadow*, *Meadow Fescue*, *Crested Dog's-tail*. These Seeds are to be had in his Botanic Garden, Brompton. See his excellent Practical Observations on the British Grasses. 1805.

SECTION II.

TABLE OF ENGLISH GRASSES.

I NOW purpose to add a few observations on some of our grasses; but as there has reigned hitherto the greatest confusion in the English names of these valuable plants; and as they have never been properly arranged except by Linnæus, I shall first, in imitation of that great author in his Flora Suecica, give new generic and trivial names sufficient to distinguish the species of all our English grasses *. I mean all those which are found in that author; as for the rest, since some are omitted by him, their names may be easily supplied when their genera are settled by the learned †. It happens very luckily, that our common people know scarce any of the grasses by name, so that something may be done to remove this confusion, if a list of names be settled by such as are likely to have influence sufficient in these matters. As to my own list, it is only meant as a hint for others.

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* Mr. Hudson having thought proper to adopt my names with some alterations; and having cleared up many of the species of grasses in a better manner than has been done before; I have referred throughout to his Flora Britannica, which is likely to be in the hands of all who are curious in botany.

† This has since been done in some measure in Hudson's Flora Britannica.

In giving names I have had two things in view. First, to retain as much as possible such as have hitherto been used for some species of the genus. Secondly, where that could not be done, to give such as are of easy and familiar pronunciation to our common people, and at the same time approach as near as possible to the Latin names in sound where they could not be interpreted. This was done for the sake of the learned, for a more easy recollection of the botanical name. Thus I have called the aira, *hair*-grass, the bromus, *brome*-grass, &c. In others I have merely translated the Latin name, as alopecurus, *fox-tail* grass, cynosurus, *dog-tail* grass, &c.

After these preliminary observations I hope it will not be necessary to make any apology for this liberty. I am certain that till names properly adapted be invented, we have little chance of seeing any general reformation in this branch of husbandry; and even after this, unless some person properly qualified should direct the country people, and shew them the grasses with their names, nothing will be drawn from that useful doctrine delivered in the Swedish Pan *. But it is to be

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* Many people having expressed a desire that I should have plates of some of the profitable grasses added to this piece, that most excellent man, the late Mr. Price of Foxley, whose extraordinary character I shall always revere, kindly condescended to employ his pencil, which, in the opinion of the best judges, was equal to things of a much superior nature, in making several drawings from the plants themselves; and a very able hand has supplied the rest, and engraved them all.

We leave this note as a tribute of respect to the memory of Mr. Price; but the reader will have perceived that we have given new hoped that gentlemen at least will not be so incurious as to remain ignorant of what imports them so much to know. Nor is the mere botanist less concerned in the success of this scheme; for there is great reason to think that many of the grasses are not thoroughly settled, varieties perhaps being put for different species †; now this uncertainty can never be cleared up except by sowing the same kind of seeds on different soils.

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and more scientific plates of the principal grasses at the time of flowering.

† Thus Gmelin, Flor. Lapp. mentions four of the meadow grasses which he says have for a long time perplexed botanists of great reputation. And the Editor of Ray's Synopsis, p. 402, doubts whether five grasses which are put down as different by Petiver be not only varieties of a grass mentioned before. I have many specimens of this grass in my collection, differing in colour, stature, and outward aspect, which yet most likely, are of the same species.

A TABLE OF ENGLISH GRASSES *.

GENUS 1.

	Vernal grass. *Plate* 1, H. 10. R. 398. 1.	Anthoxanthum *odoratum*.

GENUS 2.

	Mat grass H. 20. R. 393. 2.	**Nardus** *stricta*.

GENUS 3.

Manured	**Canary** grass H. 20. R. 394.	Phalaris *canariensis*.
Sea	**Canary** H. 21. R. 398. 4.	Phalaris *arenaria*.
Reed	**Canary** † H. 21. R. 400. 1.	Phalaris *arundinacea*.
Ribband	**Canary**	Phalaris *ibid.* 6 *ibid.*

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* The Editor gives Mr. Stillingfleet's Table of Grasses as it was originally printed. Where Mr. Stillingfleet mistook or misapplied the name, or where a different name is used by subsequent botanists, he has given a particular reference to the additional observations communicated by Professor Martyn, with the letters (A. O.)

H. refers to Hudson's Flora Britannica.
R. .... Ray, Ed. 3.
A. O..... to the Additional Observations.

† The *Reed* Canary, Phalaris *arundinacea*; and *Ribband* Canary Phalaris, *ib.* are the same species. A. O.

GENUS 4.

Green..........Panic grass..........................Panicum *viride*.
H. 21. R. 393. 1.

Loose..........Panic..................................Panicum *crusgalli*.
H. 22. R. 394. 2.

Cock's-foot.....Panic..................................Panicum *sanguinale*.
H. 22. R. 399. 2.

Creeping......Panic..................................Panicum *dactylon*.
H. 22. R. 399. 1.

GENUS 5.

Meadow......Cat's-tail grass, *Plate* 2, *No.* 1. Phleum *pratense*.
H. 22. R. 398. 1.

Branched.....Cat's-tail............................Phleum *paniculatum*.
H. 23.

Bulbous......Cat's-tail............................Phleum *nodosum*.
H. 23. R. 398. 3.

GENUS 6.

Meadow.......Fox-tail grass. *Plate* 2, *No.* 2..Alopecurus *pratensis*.
H. 23. R. 396. 1.

Field.........Fox-tail.............................Alopecurus *myosuroides*.
H. 23. R. 397. (A. O.)

Bulbous......Fox-tail *..........................Alopecurus *bulbosus*.
H. 24. R. 397. 3.

Flote.........Fox-tail.............................Alopecurus *geniculatus*.
H. 24. R. 396. 2.

GENUS 7.

Feather grass..................Stipa *pennata*.
H. 24. R. 393. 3.

GENUS 8.

Smooth........Cock's foot grass.............Dactylis *cynosuroides*†.
H. 25. R. 393. 4.

Rough........Cock's-foot, *Plate* 3..........Dactylis *glomerata*.
H. 25. R. 400. 2.

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* A variety of *Meadow* Fox-tail.

† Dactylis *stricta*. (A. O.)

GENUS 9.

	MILLET grass	Milium *effusum.*	H. 25. R. 402. 1.

GENUS 10.

Silky	BENT grass	Agrostis *spica-venti.*	H. 25. R. 405. 17.
Brown	BENT	Agrostis *canina* *.	H. 26.
Red	BENT	Agrostis *rubra* †.	H. 26. R. 394. 4.
Creeping	BENT	Agrostis *stolonifera.*	H. 27. R. 402. 2.
Marsh	BENT	Agrostis *palustris* ‡.	H. 27. R. 404. 11.
Fine	BENT, *Plate* 4, *No.* 1	Agrostis *capillaris* §.	H. 27. R. 402. 4.
Wood	BENT ‖	Agrostis *sylvatica.*	H. 28. R. 404. 13.
Small	BENT	Agrostis *minima.*	H. 28. R. Appendix.

GENUS 11.

Crested	HAIR grass	Aira *cristata* ¶.	H. 28. R. 396. 3.
Purple	HAIR	Aira *cærulea* ⸸.	H. 29. R. 404. 8.
Water	HAIR	Aira *aquatica.*	H. 29. R. 402. 3.
Turfy	HAIR	Aira *cespitosa.*	H. 29. R. 403. 5.
Mountain	HAIR, *Plate* 5, *No.* 1	Aira *flexuosa.*	H. 30. R. 407. 8. 9.

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* Agrostis *vinealis.* (A. O.)

† Milium *lendigerum.* (A. O.)

‡ Agrostis *alba.* (A. O.)

§ A. *vulgaris.* A. *canina.* (A. O.)

‖ A variety of the preceding.

¶ Poa *cristata.* (A. O.) Purple.

⸸ Melica *cærulea.*

Small-leaved	Hair H. 30.	Aira *setacea*[*].
Grey	Hair H. 30. R. 405. 16.	Aira *canescens*.
Early	Hair H. 31. R. 407. 10.	Aira *præcox*.
Silver	Hair, *Plate* 5. *No.* 2 H. 31. R. 407. 7.	Aira *caryophillea*.

GENUS 12.

	Melic grass H. 31. R. 403. 6.	Melica *nutans* †.

GENUS 13.

Middle	Quaking grass H. 32. R. 412. 1.	Briza *media*.
Small	Quaking H. 32. R. 412. 2.	Briza *minor*.

GENUS 14.

Water	Meadow grass H. 32. R. 411. 13.	Poa *aquatica*.
Common	Meadow, *Plate* 6. H. 33. R. 409. 2.	Poa *trivialis*.
Great	Meadow, *Plate* 7. H. 33. R. 409. 3.	Poa *pratensis*.
Creeping	Meadow H. 33. R. 409. 5.	Poa *compressa*.
Narrow-leaved	Meadow H. 34. R. 409. 4.	Poa *angustifolia* ‡.
Bulbous	Meadow H. 34. R. 411. 12.	Poa *bulbosa*.
Hair-leaved	Meadow H. 34.	Poa *setacea* §.
Annual	Meadow, *Plate* 8. H. 34. R. 408.	Poa *annua*.

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[*] Aira *montana*, a variety of A. *flexuosa*. (A. O.)

† Melica *uniflora*. (A. O.)

‡ Poa *nemoralis*. (A. O.)

§ A variety of Poa *trivialis*. (A. O.)

Wood	MEADOW H. 34.	Poa *nemoralis*.
Sea	MEADOW H. 35. R. 410. 7.	Poa *maritima*.
Hard	MEADOW H. 35. R. 410. 8.	Poa *rigida*.
Spiked	MEADOW H. 35. R. 395. 4.	Poa *loliacea*.

GENUS 15.

Sheep's	FESCUE grass, *Plate* 9. H. 36. R. 410. 9.	Festuca *ovina*.
	FESCUE *Ibid. b.*	Festuca *vivipara*.
Purple	FESCUE *, *Plate* 10, *No.* 1 H. 36.	Festuca *duriuscula* *.
Hard	FESCUE, *Plate* 10, *No.* 2. H. 36. R. 413. 4.	Festuca *rubra*.
Barren	FESCUE H. 37. R. 415. 13.	Festuca *bromoides*.
Wall	FESCUE H, 37. R. 411. 16.	Festuca *myurus*.
Tall	FESCUE H. 37. R. 411. 15.	Festuca *elatior*.
Small	FESCUE H. 38. R. 408. 11.	Festuca *decumbens* †.
Flote	FESCUE, *Plate* 11. H. 38. R. 412. 17.	Festuca *fluitans* ‡.
Spiked	FESCUE H. 38.	Festuca *loliacea*.
Wood	FESCUE H. 38. R. 394.	Festuca *sylvatica* §.

GENUS 16.

Field	BROME grass H. 39. R. 413. 5; 414. 7. 8.	Bromus *secalinus*.

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* Mr. Stillingfleet mistook the Festuca *duriuscula* for the F. *rubra*. See note on the Hard Fescue in the next Chapter, and the Additional Observations.

† Poa *decumbens*. (A. O.)

‡ Poa *fluitans*. (A. O.)

§ Bromus *sylvaticus*. (A. O.)

Corn	Brome	Bromus *arvensis*.	H. 39. R. 414. 9.
Upright	Brome	Bromus *erectus*.	H. 39.
Wall	Brome	Bromus *ciliatus* *.	H. 40. R. 413. 2.
Barren	Brome	Bromus *sterilis*.	H. 40. R. 412. 1.
Tall	Brome	Bromus *giganteus* †.	H. 40. R. 415. 11.
Wood	Brome	Bromus *ramosus* ‡.	H. 40. R. 415. 11.
Spiked	Brome	Bromus *pinnatus*.	H. 41. R. 392.

GENUS 17.

Naked	Oat grass §	Avena *nuda*.	H. 41. R. 389. *b*.
Bearded	Oat	Avena *fatua*.	H. 41. R. 389. 7.
Meadow	Oat	Avena *pratensis*.	H. 42. R. 405. 1.
Rough	Oat	Avena *pubescens*.	H. 42. R. 406. 2.
Tall	Oat, *Plate* 12	Avena *elatior* ‖.	H. 42. R. 406. 4.
Yellow	Oat, *Plate* 13	Avena *flavescens*.	H. 42. R. 407. 5.

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* Bromus *dimidius*. (A. O.)

† Festuca *gigantea*. (A. O.)

‡ Bromus *asper* and *hirsutus*. Great confusion has arisen from the difficulty of discriminating the different species of this Genus Bromus, which has been finally cleared up by Dr. Smith in his Observations on the Genus, in the Linnæan Transactions, vol. IV.

§ This is adopted by Stillingfleet, through a mistake, as a native. Wheat, Barley, and Oats, are arranged as *Gramina* by Linnæus; but in Theophrastus they are called *σιτηροι frumentacea;* and in English, different species of Corn. As it has never yet been found in a native state, we cannot claim it as one of our grasses. S.

‖ Holcus *avenaceus*. Smith. (A. O.) art. Avena *elatior*, p. 342.

GENUS 18.

Common	REED grass	Arundo *phragmites.*	H. 43. R. 401. 1.
Branched	REED	Arundo *calamagrostis.*	H. 43. R. 401. 2.
Small	REED	Arundo *epigeios.*	H. 43. R. 401. 3.
Sea	REED	Arundo *arenaria.*	H. 43. R. 393. 1.

GENUS 19.

Perennial	DARNEL*, *Plate* 14, *No.* 1	Lolium *perenne.*	H. 44. R. 395. 2.
Annual	DARNEL	Lolium *temulentum.*	H. 44. R. 395. 1.

GENUS 20.

	LYME grass	Elymus *arenarius.*	H. 44. R. 390. 3.

GENUS 21.

Common	WHEAT grass	Triticum *repens.*	H. 45. R. 390. 1.
Bearded	WHEAT	Triticum *caninum.*	H. 45. R. 390. 2.
Sea	WHEAT	Triticum *junceum.*	H. 45. R. 391. 5.

GENUS 22.

	BARLEY grass	Hordeum *murinum.*	H. 46. R. 392. 3.

GENUS 23.

	RYE grass †	Secale *villosum.*	H. 46. R. 392. 4.

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* Ray or Rye grass.

† This Plant is omitted by subsequent Botanists, because it is not a native of Great Britain. See an excellent engraving of it in Smith's superb Flora Græca, plate 97. See also Elymus *europæus*, Hordeum *sylvaticum*, *Wood* LYME grass. (A. O.)

GENUS 24.

Crested	DOG'S-TAIL, *Plate 2, No. 2* H. 47. R. 398. 2; 399. 3.	Cynosurus *cristatus*.
Rough	DOG'S-TAIL H. 47. R. 397. 5.	Cynosurus *echinatus*.
Blue	DOG'S-TAIL H. 47. R. 399. 4.	Cynosurus *cæruleus* *.
Bearded	DOG'S-TAIL H. 47. R. 396. 4.	Cynosurus *paniceus* †.

GENUS 25.

SOFT grass H. 374. R. 404. 14.	Holcus *lanatus*.

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* Sesleria *cærulea*. (A. O.)

† Phleum *crinitum*. (A. O.)

SECTION III.

Brief notices of some of the most profitable Grasses — Order of flowering — Some Directions for laying down to grass.

Genus the First. VERNAL * Grass. *Plate* I. p. 268.

THIS Grass grows very commonly on dry hills, and likewise on sound rich meadow-land. It is one of the earliest grasses we have, and from its being found on such kinds of pastures as sheep are fond of, and from whence excellent mutton comes, it is most likely to be a good grass for sheep-pastures. It grows to a large size in rich wet meadows, gives a grateful odour to hay, and communicates an agreeable scent to linen if kept in drawers. It is proper for parks; for in that of Felbrig, Norfolk, where it abounds, the venison is remarkably fine. This grass I have found on all kinds of ground, from the most sandy and dry to the most stiff, and even in bogs. It is very plentiful in the best meadows about London, *viz.* towards Hampstead and Hendon; it is very easy to gather, as I have found by experience, for it sheds its seeds on the least rubbing †.

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* Sweet VERNAL; Martyn. Sweet-scented VERNAL; Curtis.

† We submit to the Reader the observations of Mr. Sole on this grass, written in his peculiar style.

ANTHOXANTHUM *odoratum.*

" This grass, like the rough *cock's-foot*, is always to be found in

Genus the Sixth. *Meadow* FOX-TAIL. p. 269.

This grass, as well as the foregoing, is found in great plenty in our best meadows about London *, and I believe makes very good hay. Linnæus says, that it is a proper grass to sow on grounds that have been drained. I am informed that the best hay which comes to London is from the meadows where this grass abounds. I saw this Spring a meadow not far from Hampstead, which consisted of this grass chiefly, with some of the vernal grass and the corn-brome grass. This grass is scarce in many parts of England, particularly Herefordshire,

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flower in pastures that are well stocked; which leads me to conclude it is not over-relished by cattle in general, and therefore not deserving of the great character which some authors have given of it, merely on account of its fragrance, which perhaps is the reason why brutes reject it; since we see that sweet-meats pall *our* appetites instead of affording nourishment. It also affects poor sandy grounds; and is found very sparingly in our rich pastures about Laycock, Melksham, and Chippenham; but abundantly on the sandy soil of Spy Park, Wraxall, and our poor land under the Sham Castle, and the two Starve-alls. Yet it might do very well sown in the ratio of one eighth; for though we cannot dine on sugar, yet it has its use." Transactions of the Bath Agricultural Society. Sole's Account of Grasses, vol. IX. p. 137.

* In the finest hay that comes to London, observes Mr. Stillingfleet in another place, are *Anthoxanthum odoratum*, *Cynosurus cristatus*, *Avena flavescens*, *Agrostis capillaris*, *Bromus secalinus*, *Alopecurus pratensis*, and *Poa trivialis*.

Berkshire, and Norfolk. It might be gathered at almost any time of the year from hay-ricks, as it does not shed its seeds without rubbing, which is the case of but few grasses.

Water FOX-TAIL *. p. 269.

This is also found in the meadows about town, that are sound but lie under water in the Winter; and perhaps might be proper to sow on such grounds.

Genus the Tenth. *Marsh* BENT. p. 270.

This grass grows very commonly in moist grounds and ditches in many parts of England where I have been. I shall say more of it under article *Flote* FESCUE grass.

Fine BENT. *Plate* IV. *No.* 1. p. 270.

This grass I have always found in great plenty on the best sheep-pastures; as on Malvern-hills, and on all the high grounds in Herefordshire, that are remarkable for good mutton. I may add on Bagshot-heath, and the best sheep-pastures in Berkshire, Oxfordshire, and Norfolk.

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* This species is not enumerated in the Table, and is either the *Flote fescue*, or a variety of it. A. O.

Genus the Eleventh. *Mountain* HAIR Grass. *Pl.* V. *No.* 1. p. 270.

The same may be said of this Grass as of the foregoing. It grows in great plenty on Bagshot-heath.

Silver HAIR Grass. *Plate* V. *No.* 2. p. 271.

This is also found on the same kind of pastures as the foregoing.

Turfy HAIR Grass. p. 270.

I know nothing of this grass, but from the relation of a curious Swedish Gentleman, who tells me that it is a regular part of husbandry in Dalecarlia to sow the seeds of this species for grazing bullocks; and that they thrive extremely upon such pastures. It grows on moist, cold, and low meadows, and therefore must certainly be worth trial, especially upon so good a testimony, and where the water cannot be carried off.

Genus the Fourteenth.

Great and *narrow-leaved* MEADOW Grass. *Pl.* IV. p. 271.

These grasses are common in our best meadow-grounds, and I believe make good pasture and hay. I have found them frequently on banks by the road side, and near ditches, even where they were not to be found in the adjoining meadows and pastures.

Annual MEADOW Grass. *Plate* VIII. p. 271.

This grass makes the finest turfs. It grows every where by way sides, and on rich sound commons. It is called in some parts the Suffolk grass. I have seen whole fields of it in High Suffolk without any mixture of other grasses; and as some of the best salt butter we have in London comes from that county, it is most likely to be the best grass for the dairy. I have seen a whole park in Suffolk covered with this grass; but whether it affords good venison I cannot tell, having never tasted any from it. I should rather think not, and that the best pasture for sheep is also the best for deer. However this wants trial. I remarked on Malvern-hill something particular in relation to this grass. A walk that was made there for the convenience of the water-drinkers, in less than a year was covered in many places with it, though I could not find one single plant of it besides in any part of the hill. This was, no doubt, owing to the frequent treading *, which above all things makes this grass flourish; and therefore it is evident that rolling must be very serviceable to it.

It has been objected, that this grass is not free from bents, by which word is meant the flowering stems.

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* In his Practical Observations on Grasses, p. 29, Mr. Curtis calls it the Dwarf Meadow, and observes, "it is frequent on the edges of paths, where its seeds being scattered quickly vegetate, and, where it is not overpowered by more luxuriant herbage, not flourishing from being trodden on, as Mr. Stillingfleet has supposed."

I answer, that this is most certainly true, and that there is no grass without them. But the flowers and stems do not grow so soon brown as those of other grasses, and being much shorter they do not cover the radical leaves so much; therefore this grass affords a more agreeable turf without mowing, than any other whatever that I know of. The quantity of milk and butter produced whilst cows fed on a close of this grass in Mr. Blair's farm in Essex was taken notice of for twenty years; and the loss of it by breaking up the land was very sensibly felt.

I got a good deal of the seed, which deserves the name of manna-seeds, equally with the *flote fescue;* for it is very sweet, and I observed numbers of bees gathering honey from it. This circumstance I have not seen mentioned, though it may be very common.

Sheep's FESÇUE. *Plate* IX. p. 272.

This is the grass so much esteemed in Sweden for sheep.

Gmelin, Flor. Sibir, says that the Tartars choose to fix during the Summer in those places where there is the greatest plenty of this grass; because it affords a most wholesome nourishment to all kinds of cattle, but chiefly sheep; and he observes that the sepulchral monuments of the antient Tartars are mostly found in places that abound with this grass, which shews, adds he, that it has long been valued amongst them. I have among my grasses a specimen, but do not remember where I found it. I am certain it is not common in any of the places where I have been. Perhaps upon examination it may be found on places famous for our best mutton, as Banstead Downs, Church-Stretton in Shropshire, some parts of Wales, &c.

I have since found this grass in great plenty in many parts of England and Wales; indeed on all the finest sheep-pastures in Herefordshire, Berkshire, Oxfordshire, Norfolk, &c. It abounds on Newmarket-heath, and forms a most beautiful turf. The reason why I thought it not common, was, that it is an early grass, and had shed its seeds, before I usually made my searches in those places where it grows. I must also observe that, contrary to what Linnæus says, either the sheep, or some other animals, do eat the flowering stems of this grass; for upon Banstead-downs there was nothing to be seen but the radical leaves, unless amongst the bushes near the hedges, where it was guarded from the sheep *.

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* One of the excellencies of this plant is that it will grow upon such soils as hardly any other good kind of grass will live upon. And although the farmer cannot from these expect a crop equal to the produce of his richer fields, yet it is no small convenience to have a plant for covering the most barren spots, which, without this care, might have remained bare many years.

Anderson's Annals of Agriculture, vol. II. p. 214.

It likewise often continues green during winter. After a long

Genus the Fifteenth. *Purple* FESCUE *. *Pl.* X. p. 272.

This grass I have always found along with the fine BENT and silver HAIR GRASS, particularly on Banstead-downs, in great plenty, in a place inclosed in order to keep the sheep out. From hence I am inclined to think that this is the chief grass all over the Downs; but as the flowering stems in the other parts were entirely gone except along the hedges, I could not be certain.

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account of this species he adds: "I have been very particular with regard to this plant, because it promises, on many accounts, to make a most valuable one to the farmer; though it must be added, that in time, even upon rich soils, the spike becomes so close as to check its growth, and for that reason it always forms a dry pasture, much fitter for sheep than cattle. Anderson, p. 216.

* It cannot reflect any discredit on the accuracy of Mr. Stillingfleet, that he, in this instance, fell into the same error as the best Botanists of his time. The purple fescue, or Festuca rubra has, however, been lately ascertained by Mr. Woodward at Yarmouth, where it grows on the shore, being naturally a maritime plant, and consequently not likely to be the chief grass on Banstead-downs, as Mr. Stillingfleet asserts. The place of growth, and his figure T 9, clearly prove that his was the Festuca duriuscula, or hard Fescue, a very common inhabitant of pastures, and often strongly tinged with a red colour.

We have given plates both of the F. duriuscula and F. rubra, from which the observer will plainly see their difference.

Tall FESCUE. p. 272.

This affords the best pasture; and so does Turfy Hair-grass. These were first observed by Mr. Bielke, who took great pains in collecting grass seeds; but without judgment.

Flote FESCUE. *Plate* XI. p. 272.

At Waghen in Holderness I observed thirty or forty acres of the Flote Fescue grass which let for very little. The tenants spoke slightingly of it, though I drew from them that it is extremely nourishing; and one of them particularly told me, that had it not been for this grass they should have had nothing for their cattle and horses the summer before. About Hull there is a great quantity of it; and a farmer told Mr. Bowyer's steward that it gave their horses the water-farcy. But upon further enquiry it appeared that it is too nourishing for horses that did not work, though it was never known to affect horses that do work; but, on the contrary, keeps them in good heart. About one hundred and sixty acres of ground, where much of this grass grows, is let by Mr. Bowyer for 4*l.* a year per acre.

There is a clamminess in the ear of the flote fescue, when the seeds are ripe, which tastes like honey, and for this reason they are probably called manna seeds.

The author of a treatise in the Amœnitates Academicæ, vol. III. entitled, Plantæ Esculentæ, observes, that the seeds of this grass gathered yearly in Poland, are sold in Germany, and sometimes in Sweden, under the name of manna seeds. They are much used at the tables of the great, on account of their nourishing quality and agreeable taste; and I was informed by Dr. Solander that they are made into excellent cakes, and ground and boiled in milk, afford delicious pottage. It is wonderful, adds the same author, that these seeds have been so much neglected among us, since they are so easily gathered and cleansed.

According to Linnæus, Flor. Suec. art. 95, the husks of this grass will cure horses of the botts, if kept from drinking several hours.

Mr. Dean, a very sensible farmer at Ruscombe in Berkshire, assured me that a field always lying under water, of about four acres, that was occupied by his father when he was a boy, was covered with a kind of grass that maintained five farm-horses in good heart from April to the end of harvest, without any other kind of food, and that it yielded more than they could eat. He at my desire brought me some of the grass, which proved to be the flote FESCUE with a mixture of the marsh BENT; whether this last contributes much towards furnishing so good pasture for horses I cannot say. They both throw out roots at the joints of the stalks, and are therefore likely to grow to a great length. In the index of dubious plants at the end of Ray's Synopsis, there is mention made of a grass under the name of *Gramen caninum supinum longissimum*, growing not far from Salisbury, twenty-four feet long. This must, by its length, be a grass with a creeping stalk; and that there is a grass in Wiltshire growing in watery meadows so valuable that an acre of it lets from ten to twelve pounds, I have been informed by several persons. These circumstances incline me to think it must be the flote Fescue; but whatever grass it be, it certainly must deserve to be inquired after.

This kind of grass in Wiltshire is, I believe, called knot-grass by the inhabitants, from whom my friend Dr. Dampier procured the following account, at my desire: "It grows on a little spot of land in a valley about nine miles from Salisbury, near the villages of Maddington and Shrewton, and close by a farm belonging to Mr. Gore, called Elton, rented by farmer Gray, who chiefly communicated the particulars here recited. The valley (as much of it as concerns the matter in question) is about eight or ten acres, running from East to West. At the upper end of this part of the valley there rises a spring generally a little before Christmas, sometimes not till the beginning of the year, which, flowing down, and lying upon a particular spot (consisting of near an acre and a half), during two, three, and sometimes four months, produces a grass which runs along the ground eighteen, often twenty, feet long, sticking, with its fibrous knots, upon the moss, very rich, thick, and sweet. It is mowed about the end of May, when the surface of the land is dry. It grows in such abundance that the mowers are obliged to make two swarths, or a double cutting of it; and moreover they have two crops of it. The stalk of this grass, when in its perfection, is as big, according to farmer Gray's expressions, as the small end of a tobacco-pipe, and so very sweet that the sheep choose it beyond the best hay from other places. Cattle soon grow fat with it; and horses, when they eat of it, froth at the mouth from its delicious juiciness. The spring at the upper side of the valley, which contributes to the produce of this extraordinary grass, does not always rise yearly, and consequently the crop sometimes fails; but what is most remarkable is, that the water flowing from this spring first covers two or three acres of land, which is not rendered more than commonly fertile by it, before it reaches the spot of about an acre and a half above-mentioned, which is so enriched by it, that the Clergyman of the parish has been known to refuse three guineas for the tithe. The water is three or four feet high, and runs in great plenty; and the parts of the end of the valley, that it runs down upon from the above-mentioned particular fruitful spot, abound in the same sort of knot-grass; and at the end of the valley there are also other springs which rise more constantly than the spring at the upper end, and where they flow, they cause a fruitfulness, but not equal to what I have before spoken of *.

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* Mr. Stillingfleet here alludes to the famous Orcheston Meadow,

Genus the Seventeenth. *Yellow* OAT. p. 273.

This grass is found in great plenty in some grounds where the sheep's FESCUE, the fine BENT, and the crested DOG-TAIL grow, and therefore likely to be good for sheep. It is also not uncommon in good meadows.

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of which we subjoin an account communicated by Professor Martyn. It was once supposed that this grass was the Agrostis stolonifera, one of the worst kinds; however it has at length been ascertained that the famous long grass of Orcheston is not a species peculiar to the spot; but that the meadow is composed of many species which commonly grow in other places.

Mr. Curtis had five turfs sent him from this meadow, which he planted in his garden at Lambeth-marsh. Poa trivialis, or rough-stalked Meadow-grass, appeared in all the six. Agrostis palustris, or marsh Bent, in three; Alopecurus pratensis, or meadow Fox-tail, in two; Triticum repens, or common wheat grass, p. 274. alias couch, quich, in four; And Avena elatior, or tall oat-grass, in one. Hence he reasonably concludes, that the extraordinary fertility of this meadow arises, not from any grass peculiar to it, but from several unusual circumstances concurring, and favouring, in an uncommon degree, the growth of certain well-known grasses.

A friend of Mr. Swayne being on the spot when the meadow was mowing, and having been directed to the *real long grass* by the farmer and labourers, brought away Alopecurus pratensis, or meadow Fox-tail. The year following Mr. Swayne himself visited Orcheston the first week in June: the greater part of the meadow was then mown. The standing part, about a quarter of an acre, presented a thick and beautiful assemblage of the flowering panicles of Poa trivialis. It was lodged or lying on the ground, had put forth roots at the knots, and began to be erect only at the last knot or two.

Genus the Nineteenth. *Perennial* Darnel.

Pl. XIV. p. 274.

This grass is well known, and cultivated all over England; and it is to be hoped the success we have had with it will in time encourage our farmers to take the same pains about some others that are no less valuable, and are full as easy to be separated. It makes a most excellent turf on sound rich land where it will remain.

Mr. Swayne remarks, that no grasses but such as flower early, could be in bloom at the first mowing; and that whatever grasses are in flower at the last mowing must be of the late-flowering kinds. So that Agrostis stolonifera, or creeping bent, which Mr. Sole determined to be the Orcheston grass, might be predominant at the time of the latter mowing.

Dr. Maton visiting Orcheston on the 15th of August, found Holcus lanatus, or meadow soft-grass, Lolium perenne, or ray-grass, and Agrostis stolonifera, all pretty nearly of the same length, measuring about seven feet. They usually rise, as he understood, about sixteen or seventeen inches before they fall, and run along the ground in knots, which knots send forth shoots into the interstices of the pebbles. In June, he adds, Triticum repens, Avena elatior, Alopecurus pratensis, and Poa trivialis, are seen thriving similarly to the species above mentioned. He speaks of having specimens of the last measuring near ten feet in length; and of some of the spikes of Triticum repens having between forty and fifty glumæ.

Here we have no less than eight species of grass ascertained to grow in this meadow; and there is little doubt but that several more would be found, if it were duly searched whilst the herbage was standing.

Orcheston St. Mary is about eleven miles from Salisbury. The meadow is about half a mile from Shrewton, in the lowest part of a

If I may judge by the venison I have eat out of a paddock that was chiefly filled with this grass, I would by no means recommend it for parks. I know it will be said that venison is never good out of a paddock, that the deer must have room to range, trees to browse on, &c. &c. I grant there is some reason for saying this, but I believe in general it is more owing to want of proper food, *viz.* good grass, than merely to confinement; for paddocks are generally made by converting

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very narrow winding valley, sheltered on each side by gradual acclivities of chalk. This valley forms a channel for the floods which come down from Tilshead, about three miles distant, in the winter season. This meadow being the lowest of the range, the water rests there to some depth; and indeed it is hardly otherwise than swampy throughout the year. There is one spring not half a mile distant, and therefore the water by which the meadow is often submerged, may at first be of a higher temperature than the surrounding atmosphere. The earlier the springs swell, the more plentiful is the succeeding crop of grass. A bed of small loose pebbles, of a siliceous nature, with a scanty covering of mould, formed from the decomposed relics of vegetables, constitutes the immediate soil.

Maton in Linn. Trans. vol. V. p. 28.

In addition to the remarks on this singular variety of grasses, we refer the reader to two Memoirs by the Rev. Dr. W. Richardson, on an Irish grass, which he calls Fiorin, much resembling this celebrated Orcheston grass, in its properties and luxuriant growth. It is not sufficiently ascertained to what class it belongs, being by some compared to the Agrostis stolonifera, and by others to the Festuca pratensis. Though its qualities may perhaps be over-rated, it certainly deserves the attention of agriculturists. One of these memoirs was printed in the sixth volume of Communications of the Board of Agriculture; and the other among the Transactions of the Belfast Literary Society.

some rich spot near the house, that has constantly been manured, and of course is full of grasses fitter for the dairy or the stable than for deer, which hardly ever is the case of large parks. No man will, I suppose, pretend to make good pork from a hog fed with grains instead of peas, though he has the liberty of choosing as much ground as he pleases, and where he pleases. This grass is called in many countries *rye* grass. It were to be wished that the old name might prevail, because there is a genus of grass, *viz.* the 23d, known by the name of *rye* grass, all over the kingdom, of which genus there is a species that ought to bear the same generical name *.

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* In the time of Mr. Stillingfleet there was great confusion in regard to this Genus, the Lolium of Linnæus, which he in vain endeavoured to clear up. Subsequent Botanists found still greater difficulties in ascertaining this point, and the obscurity was not ultimately removed till the publication of Dr. Smith's Flora Britannica.

The Lolium *perenne* is by him ascertained to be the perennial darnel of Stillingfleet; the Red Darnel of Withering, the real rye, or rather ray grass.

The Lolium *temulentum* is the annual darnel of Stillingfleet, and the bearded darnel of Smith.

See Additional Observations, art. Lolium perenne. L. temulentum, and Elymus Europæus.

The *Lolium perenne*, though depreciated by some writers, is strongly recommended by practical farmers. Mr. Sole observes, it is an excellent grass both for pasture and hay. "Clean hay," he adds, "from this grass, is preferable for race-horses and hunters, as it does not affect their wind; and although it runs to bent, yet the juice is so concentrated as to afford greater nourishment than twice

I have since eaten venison out of a large park where there was much of this grass, and it was no better than that out of the paddock. Hence I should be apt to think that this grass would not be proper for sheep, as I have always observed that the same kind of ground which yields good venison yields good mutton. For what particular uses it is good remains to be tried, whether for

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the quantity of common hay. It suits most of the strong fields about Bath. Mr. Coome had a fine crop of it last Summer, and his horses are so very fond of it as to prefer it to clean corn." Bath Transactions, p. 149.

It is likewise strongly recommended by Marshal in the chapter on the cultivated Grasses in the Vale of Gloucester; and the prejudices entertained against it, as if it choaked all other grasses, shewn to have no foundation. Rural Œconomy of Gloucestershire, vol. I. p. 159. 169. He only cautions the husbandman against sowing it in too great quantities; and adds, "A nutritious bite in the spring and autumn is certainly better than a want of it. By sowing a *small* quantity of ray-grass, and keeping this closely pastured in the spring, the summer grasses natural to the soil have little more impediment to their rising than they would have if no ray-grass were sown.

Mr. Ricards, Secretary to the Bath Agricultural Society, sells the seed of this species, which in the Western counties is known by the name of Peesey's perennial ray-grass, from its discoverer, a capital farmer of Cledglow, near Tetbury. To draw attention, and raise it in the estimation of the public, it was sold at 10*s.* 6*d.* a bushel; but, when this price had produced the effect of bringing the grass into more general cultivation, it was gradually reduced to the present average of 7*s.* 6*d.* a bushel.

The grass is cultivated in large quantities, and regularly threshed. It is mixed with clover, at the rate of a bushel or bushel and a half to fourteen pounds of clover *per* acre; but if sown alone, three bushels *per* acre.

the dairy, for fatting cattle, or for horses. Many are tempted by the facility of procuring the seed of this grass to lay down grounds near their houses where they want to have a fine turf; for which purpose, unless the soil be very rich, a worse grass cannot be sown, as it will certainly die off in a few years.

Genus the Twentieth. LYME *Grass*, *Upright-sea*. p. 274.

This, with Carex *arenaria*, binds moving sands far from the sea, and proves very advantageous for this purpose.

Genus the Twenty-fourth. *Crested* Dog-tail.
Plate II. No. 2. p. 275.

This grass, I imagine, is proper for parks. I know one * where this abounds that is famous for excellent venison. It may perhaps be as good for sheep.

That it is good for sheep I have found since by experience. The best mutton I have tasted, next to that which comes from hills where the purple and sheep's fescue, the fine bent, and the silver-hair grasses abound, having been from sheep fed with it.

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* He means Felbrig; and in another place observes: "The park at Felbrig is full of the vernal grass, festuca ovina, cynosurus cristatus, with a little darnel."

The park at Gunton full of darnel, with some vernal. The difference of the grasses will account for the difference of the venison. That at Gunton is very ordinary; that at Felbrig remarkably good. This confirms my observation about the darnel, in relation to venison, in my book.

It makes a very fine turf upon dry sandy or chalky soils, as I have seen in many parts of Berkshire; but unless swept over with the scythe, its flowering stems will look brown; which is the case of all grasses which are not fed by variety of animals. For that some animals will eat the flowering stems is evident by commons where scarcely any parts of grasses appear but the radical leaves. The seeds may be gathered near a month. It sheds the seed before the cat's-tail is ripe; and that grass begins to ripen when the hawthorn-berry is red.

Directions for preparing Land proposed to be laid down with Grass-seed which was sown to White Clover the Summer before.

PLOUGH the land in March as deep as the nature of the soil will admit. Harrow after the weeds are about flowering, *viz.* some time in May, or sooner, if it be a forward Spring. Plough about ten days after it is harrowed. Harrow when the weeds are come up again. Lay down dung or compost. Plough in a moderate depth immediately, so that the teeth of the harrow, after rolling, may reach it. Roll the land down every day as it is ploughed with a light roller, and observe not to spread the dung long before it is ploughed in. When the weeds come up that are produced by the dung, harrow the land well, so as to bring up the dung, and mix it with the soil, observing not to harrow more at once than can be ploughed in a day. Plough it up after the harrows the same depth as before, and follow the plough with a roller. The land will now be under the proper preparation for the seeds, which may be sown after the first soaking rain from the end of August to the end of September, in the following manner. Plough the land about the same depth as before. Harrow it once in a place, and sow the seeds after the harrow; then with a bushed hurdle harrow the seeds in. When the plants appear, roll the land with a light roller, and not before, except the weather prove very dry, in which case it will be necessary to roll it with a very light roller after the bush-harrow. A light dropping of good manure laid on with the first frost will be of great use in preserving the grass early in the season, and encouraging its growth afterwards. A light roller used after every frost will be of great service the first winter.

THERE is no part in the œconomy of farming more difficult than to fix on the fittest time for hay-harvest; as the finest crops are often spoiled by being cut either too early or too late; but most often in the latter case. The usual rule for mowing is when the ear is in blow; for at that time the leaves begin to wither, and turn yellow, and no longer grow, as the nourishment is principally diverted to ripen the seeds. Those grasses indeed whose seeds are of consequence, as the field brome, or the tall oat, may be suffered to stand a little longer; but in general I am certain, that grasses which are not mowed till the blow is over will never produce a good crop, unless when the meadow contains various kinds that come into ear at very distant times. With this view I subjoin the order in which the grasses come into ear *.

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* The blue dog's-tail grass, according to Curtis, is the most early of the British grasses, and the vernal the next in succession. Perhaps in strictness of speech this is the fact; but probably Mr. Stillingfleet mentions the annual meadow as the first in ear, because it flowers occasionally even in winter, when the weather is mild, and therefore some of the ears are always in bloom early in the spring; though he allows that with the other poas the end of June is its usual time for blowing. According to Dr. Smith it is found in bloom from March to November.

Order in which the Grasses usually come into Ear.

Annual MEADOW	POA *Annua.*
Meadow FOXTAIL	ALOPECURUS *pratensis.*
[*Sweet*] VERNAL	ANTHOXANTHUM *odoratum.*
Great MEADOW	POA *pratensis.*
Narrow-leaved MEADOW	POA *angustifolia* [*nemoralis.*]
Crested DOG'S-TAIL	CYNOSURUS *cristatus.*
Sheep's FESCUE	FESTUCA *Ovina.*
Purple FESCUE [should be *Hard.*]	FESTUCA *duriuscula.*
Fine BENT	AGROSTIS *capillaris* [*vulgaris* or *canina.*]
Marsh BENT	AGROSTIS *pratensis* [*alba.*]
Fine HAIR	AIRA *caryophillea.*
Yellow OAT	AVENA *flavescens.*
Flote FESCUE	FESTUCA [POA] *fluitans.*

The whole time from the beginning of May till about the middle of June.

> Ει—κεν και σμικρον επι σμικρῳ καταθειο
> Και θαμα τουθ' ἐρδοις, ταχα κεν μεγα και το γενοιτο *.
>
> HESIOD.

THIS table cannot be considered as otherwise than imperfect in some respects; for it is extremely difficult to ascertain the precise time of flowering, as well because many of the grasses continue in flower during several months, and some, as the VERNAL, even in the winter, when the weather is mild; as because they blow earlier or later, according to the nature of the soil, climate, situation, and quality or quantity of manure. From several memoranda among Mr. Stillingfleet's manuscripts, on the time of flowering and maturity of the seeds, it is evident that he intended to have formed a more extensive and specific table. These are, however, not sufficient to enable the editor to fulfil that intention, and too imperfect to be printed. He must therefore refer the botanical reader, in general, to Professor Martyn's additional observations, to Withering, and to Dr. Smith's Flora Britannica, in which the time of coming into ear is noticed under each species.

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* Perhaps this adage from old Hesiod may be most expressively rendered by one of our vulgar though just proverbs:

"Many a little makes a mickle."

It may not however be superfluous to add, that if a close is designed for hay, it should consist of only one grass, or at least of such as are ripe, and fit for the scythe at the same time; but if for feeding, then a succession of the best grasses, from the earliest to the latest, is desirable as affording a constant fresh bite.

Of our native grasses Mr. Stillingfleet noticed twenty-five genera, and ninety-five species, of which only one genus, the secale villosum, has been struck out by succeeding botanists, and some of the species proved to be varieties. Dr. Withering has twenty-eight genera, and one hundred and twenty-two species. Curtis, twenty-five genera, and an hundred and twenty-three species;

but he suspects that several of these will be proved to be varieties. Dr. Smith has enumerated twenty-eight genera and an hundred and seventeen species. Probably future researches will add to this catalogue, particularly as in the last edition of the Species Plantarum, by Wildenow, he makes the whole number of grasses (including the foreign) to amount to fifty-three genera, and six hundred and sixty-one species. The reader who is not a botanist, will doubtless be surprized at this extraordinary number of species which are by farmers all confounded under the common name of grass; and all must admire the beneficence of Providence in giving so many varieties of a plant which forms the common covering of the earth, and is as necessary to existence as agreeable to the eye.

ADDITIONAL OBSERVATIONS ON GRASSES,

COMMUNICATED BY PROFESSOR MARTYN.

ADDITIONS

TO THE

TABLE OF ENGLISH GRASSES.

N.B. **S. refers to the Flora Britannica of Dr. Smith.**
W...... to Dr. Withering's Arrangement.
E. B.... to English Botany.
M.. .... to Martin's Flora Rustica.
C....... to Curtis's Flora Londinensis.

Cat's-tail	CANARY grass	Phalaris *phleoides.*
	S. 63. W. 114. E. B. *t.* 459.	
Rough	PANIC grass	Panicum *verticillatum.*
	S. 64. H. 24. W. 114. C. 4. t. 6.	
Alpine	CAT'S-TAIL grass	Phleum *alpinum.*
	S. 69. W. 119. E. B. *t.* 519.	
Bearded	CAT'S-TAIL	Phleum *crinitum.*
	S. 71. Schreb. gram. 151. t. 20.	
Sea-side	BENT grass	Agrostis *littoralis.*
	S. 78. E. B. *t.* 1251.	
Bristly	BENT	Agrostis *setacea.*
	S. 79. C. 6. *t.* 12.	
Reflexed	MEADOW grass	Poa *distans.*
	S. 96. W. 141. *t.* 25. C. 6. *t.* 1.	
Procumbent Sea	MEADOW	Poa *procumbens.*
	S. 98. E. B. *t.* 532. C. 6. *t.* 11.	
Alpine	MEADOW	Poa *alpina.*
	S. 100.	
Zigzag	MEADOW	Poa *flexuosa.*
	S. 101. E. B. *t.* 1123.	
Sea-green	MEADOW	Poa *cæsia.*
	S. 103.	

Single-husked	FESCUE grass	Festuca *uniglumus.*	S. 118.
Reed-like	FESCUE	Festuca *calamaria.*	S. 121. E. B. *t.* 1005.
Meadow	FESCUE, *Plate* 15,	Festuca *pratensis.*	S. 123. C. 6. *t.* 7. M. *t.* 84.
Downy Rye	BROME grass	Bromus *multiflorus.*	S. 126.
Soft	BROME, *Plate* 16,	Bromus *mollis.*	S. 126. C. 1. *t.* 8. M. *t.* 99.
Smooth	BROME	Bromus *racemosus.*	S. 128.
Bristle-pointed	OAT grass	Avena *strigosa.*	S. 1390. E. B. *t.* 1266. W. 166.
White	DARNEL grass	Lolium *arvense.*	S. 150. W. 168.
Sea	HARD grass	Rotbollia *incurvata.*	S. 151. W. 169. Fl. dan. *t.* 938.
Pendulous	LYME grass	Elymus *geniculatus.*	S. 153. W. 1. 134. *t.* 2. *f.* 26. Curt. obs. 46.
Wood	LYME grass	Elymus *europæus.*	S. 154. W. 170.
Meadow	BARLEY grass, *Plate* 14, *No.* 2.	Hordeum *pratense.*	S. 156. W. 171. E. B. *t.* 409. M. *t.* 108.
Sea	BARLEY	Hordeum *maritimum.*	S. 156. W. 172. M. *t.* 44.
Dwarf Sea	WHEAT grass	Triticum *loliaceum* Poa *loliacea.*	S. 159. W. 174. E. B. *t.* 221.
Creeping	SOFT grass	Holcus *mollis.*	S. 89. W. 135. C. 5. *t.* 8.

ADDITIONAL

OBSERVATIONS ON GRASSES.

ANTHOXANTHUM odoratum. *Sweet Vernal grass.*

C. 1. t. 4. W. 58. M. 23. S. 31. E. B. t. 64.

IT might probably be cultivated to advantage, for in good meadows it grows to a reasonable height, and forms a thick tuft of tender succulent leaves at bottom; though in point of crop it is not so productive as some other grasses. Cattle of all sorts seem to be fond of it. Mr. Curtis suggests, that probably common meadow, with meadow fescue, joined to this grass, would form an excellent mixture for laying down meadows. It is the earliest of all the grasses, except *Cynosurus cæruleus.* Very few seeds are produced by it. In its agreeable scent it approaches the *Schœnanthus*, and other odoriferous grasses of the East Indies: this is probably owing to the minute yellow dots scattered over the husk, similar to those of black currants.

It abounds chiefly in wet lands, flourishing in a particular manner on peat bogs. The valves of the blossom adhere to the seed when it is ripe; and the jointed awn, by its spiral contortions through the alternate moisture and dryness of the air, assisted by the awn and the hairs which cover the valves, which, from the same cause, act as so many levers, separate it from the receptacle, and lift it out of the calyx at a time when the spike is necessarily kept in an erect situation by a throng of taller grasses surrounding them. A most curious and beautiful contrivance of nature, without which, or some similar provision, the seeds, in wet seasons, would be apt to vegetate in the husks, and the young plants, in consequence, become abortive. Withering, from Swayne.

PHALARIS canariensis. *Cultivated Canary grass.*

W. 113. M. 17. S. 62. E. B. t. 1310.

This is not properly indigenous of England; but has escaped from fields where it is cultivated for feeding small birds, and occurs about dunghills, by road sides, where it has been cast out among rubbish, or dropped by birds. It is finely figured in Smith's Flora Græca, Pl. LV.

PHALARIS phleoides. *Cat's-tail Canary-grass.*

W. 114. S. 63. E. B. t. 459.

This grass appears not to have been known by Hudson. It is certainly different from his *Phleum paniculatum*, which he supposed to be Linnæus's *Phalaris phleoides*. It has been observed in Cambridgeshire and Norfolk; is perennial, and flowers in July.

PHALARIS arundinacea. *Reed Canary grass*, is ARUNDO colorata, or *Canary Reed grass.*

W. 124. S. 147.

Of which *Ribband grass* * is a variety. It grows on the banks of rivers and ditches; and is used to thatch ricks and cottages.

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* In an article of the Bath Agricultural Society, vol. X. p. 199, Mr. Robert Hubert has made some curious observations on the Ribband grass: "Observing, from time to time, the immense produce of an ornamental grass in my garden, and which is distinguished in Miller's Dictionary by the name of Striped or Ribband grass, it occurred to me, that Nature in her bounty did not bestow such a prolific quality on this beautiful grass but for some wiser purpose than merely to gratify the eye. I therefore examined it attentively, and found it to be very succulent, and possessing much sweetness; and, on offering it to my horses and cows, that they fed on it very eagerly. I had by me a calf just weaned, which I kept wholly by it for a month, and notwithstanding it had so recently been taken from its mother, this grass supported it admirably, and I had the pleasure of seeing it thrive beyond my most sanguine expectations. I ascertained, in the course of the year, that I could cut it three or four times, and that its produce was always prodigious. It takes a very deep root, produces an early spring crop, and, I believe, is an excellent summer-food for cattle: in the winter it disappears. I should imagine it may be raised from seed; but I have found it to be easily propagated by dividing the roots into smaller plants, and disposing of them at distances from four to six inches. In moist ground it spreads rapidly, and soon forms a thick mass of food exceeding any other kind I ever witnessed. Its durability is such, that what I have in my garden, which has been there to my knowledge these twenty years, is as thriving, and yields as much, as ever."

PANICUM verticillatum. *Rough Panic grass.*

W. 114. S. 64. E. B. t. 849.

Certainly distinguished from *P. viride*, as Mr. Curtis observed, in having the involucres rough backwards. It is annual, and found in moist arable fields, flowering in June and July.

PANICUM viride. *Green Panic.*

C. 4. t. 5. W. 115. S. 65. E. B. t. 875.

Not common in England, though the most common of the Panics. Annual, flowering in July and August. Mr. Curtis observes, that sparrows are so fond of the seeds of the Panics, that they cannot be saved in a garden without protection. The Panics are not cultivated.

PHLEUM pratense. *Meadow Cat's-tail grass.*

W. 117. M. 5. S. 68. E. B. t. 1076.

Varies much in size and in the length of the spike; it has also a leafy spike in common with many other grasses, occasioned by the seeds germinating in wet weather without falling. A variety with a bulbous root *Ph. nodosum*, is set down for a distinct species; but this swelling of the root is a very equivocal character in grasses; and *P. pratense* is much given to it.

It was much recommended about 40 years since, under the name of *Timothy grass*, being brought from North America as a new species, though it is very common in England. It was said to have a great character in North America, where it is called *Herd grass;* but its reputation here was short-lived. Some foreign writers speak well of it; but with us it is coarse and late, and greatly inferior to *Fox-tail grass* in every respect. In moist grounds, kept down very close by stock, it might answer with other coarse grasses, such as *Tall Oat* and *Rough Cock's-foot* or *Orchard Grass.* Flowers in July and August.

PHLEUM alpinum. *Alpine Cat's-tail.*

S. 69. E. B. t. 519.

Found only on mountains. It makes a principal part of the turf, in the most elevated pastures of Switzerland. Perennial, flowering in July.

PHLEUM paniculatum. *Branched* or *Paniculated Cat's-tail.*

W. 117. S. 70. E. B. t. 1077.

Certainly a *Phleum* and not a *Phalaris:* well described by Hudson, as Dr. Smith observes. Annual. July.

PHLEUM crinitum. *Bearded Cat's-tail.*

S. 71.

Alopecurus monspeliensis. *Lin. spec.*

A. aristatus. *Huds.* 28.

Marshes and wet pastures. Annual July.

β. Cynosurus paniceus. *Bearded Dog's-tail.*

Alopecurus paniceus. *Lin. spec. Huds.* 28. *With.* 121. is only a smaller and more tender variety. Mr. Hudson thinks that the difference may arise merely from situation.

ALOPECURUS pratensis. *Meadow Fox-tail.*

C. 5. t. 5. W. 119. M. 6. S. 72. E. B. t. 759.

This excellent grass is most abundant in moist meadows, where the soil is good: neither very wet nor dry grounds agree with it. Fox-tail is one of the earliest grasses, producing its spike in April or May, with Vernal-grass and Ladies-smock. Mr. Majendie's crop of Fox-tail was ready to mow on the 14th of May, 1786. It frequently flowers twice in one season, and therefore should seem to be proper for such lands as will admit of a second crop being taken. It undoubtedly possesses the three great requisites of quantity, quality, and earliness, in a degree superior to any other.

This is the best grass to sow in low meadow grounds, or in boggy places which have been drained. Sheep, horses, and goats eat it; cows and swine are not fond of it. Linn. But Dr. Pulteney says, this is the most grateful of all grasses to cattle. ALOPECURUS *pratensis* is a grass very promising for cultivation. Lewis Majendie, esq. of Hedingham Castle, Essex, has cultivated it on a considerable scale, and finds it to be an excellent grass. There is, however, one circumstance which will be a great impediment to its general cultivation, viz. the depredations of the larva of a species of Musca, which devour the seed so much, that in many spikes you will scarcely find one perfect. Swayne.

ALOPECURUS myosuroides. *Field Fox-tail.*

A. agrestis. *Linn.* &c. *Slender Fox-tail.*

C. 2. t. 7. W. 119. M. 22. S. 73. E. B. t. 848.

Easily distinguished from Meadow Fox-tail by the great length and slenderness of the spikes, tapering to a point; they are usually of a purple colour, and when in full flower bend a little. It seems also to be annual, and is a weed in cultivated ground. It flowers early, continues flowering till Autumn, and comes into bloom very quickly after being sown; but it can answer no purpose to bring it into cultivation. Mr. Stillingfleet observed it in blow so late as Sept. 27, at Waghen, near Holderness, Yorkshire.

ALOPECURUS bulbosus. *Bulbous Fox-tail.*

W. 120. S. 73. E. B. t. 1249.

Certainly very different from *Flote Fox-tail,* of which Mr. Hudson supposed it to be a variety. Salt marshes. Perennial. July.

ALOPECURUS geniculatus. *Flote Fox-tail.*

C. 5. t. 6. W. 120. M. 97. S. 74. E. B. t. 1250.

Easily known by the frequent joints on the stem changing their direction at an angle, and giving it the appearance of being broken. It frequently puts out roots from the joints under water, whilst the leaves float on the surface. From the deep purple colour of the spikes, it is called in some places *Black-grass*. It sometimes occurs in dry pastures; and then it grows more upright, the spike becomes much more slender, and the base of the stalk swells out into a kind of bulb.—Perennial; flowering in July. Cattle eat it readily; but it is not a profitable grass to cultivate. Mr. Stillingfleet, in his observations, calls it *Water Fox-tail*.

STIPA pennata. *Feather-grass.*

W. 163. S. 138.

This can scarcely be reckoned of British growth. The feathered awns are remarkable, and distinguish it from all other grasses. Johnson, the editor of Gerarde's Herbal, says it was nourished in sundry of our English gardens; and that it was worn by ladies and gentlewomen instead of a feather, which it exquisitely resembles.—Perennial; July, August.

DACTYLIS stricta. *Smooth Cock's-foot grass.*

S. 110. E. B. t. 380. W. 149. t. 27.

Salt-marshes. Perennial. August. Mr. Stillingfleet has it under the name of *D. cynosuroides*, with which Hudson had confounded it: but it is very different from that, which is a native of America. Perennial, Aug. Sept.

DACTYLIS glomerata. *Rough Cock's-foot* *.

W. 150. M. 14. E. B. t. 335. S. 111.

No grass is more common than this: from its flourishing under the shade of trees it has been called *Orchard-grass*. It is rough and coarse, but very hardy and productive: Mr. Curtis adds, that it is rather early. It drops the seed. The head is so large that in heavy rains it is apt to be laid. Mr. Young is rather partial to this grass on account of its productiveness; but it must be cut whilst young and tender, either for hay or fodder. It is not disliked by cattle, except when grown on rank soils. Perennial, June, August.

MILIUM effusum. *Common Millet-grass.*

C. 4. t. 12. W. 122. S. 75. E. B. t. 1106.

The height to which it grows (three or four feet), its situation, in moist woods, and the delicacy of its panicle, distinguish this from other British grasses. It is perennial, and flowers in May or June. Mr. Stillingfleet observed it in ear May 31, 1761.

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* From the Account of the Agricultural Meeting at Holkham-hall in Norfolk, June 19, 1809.

"A layer laid down with cock's-foot-grass, and a little Dutch clover with it, Mr. Coke pointed out as deserving particular attention. It had maintained, in capital condition, ever since the turnips were consumed, seven sheep per acre, and would have carried more. The cock's-foot-grass Mr. Coke most highly recommended as being far preferable to rye-grass, which was a more exhausting crop. As a proof of its vegetative power, a plant of cock's-foot constantly cut down close for twenty-two days, grew every twenty-four hours an inch in height, and, shooting most luxuriant branches, afforded more abundant food than the rye-grass. Two bushels of the cock's-foot seed, with eight pounds of Dutch clover, should be sown per acre."

AGROSTIS Spica venti. *Silky Bent grass.*
W. 126. S. 77. E. B. t. 951.

This grass grows to the same height with the *Milium.* The panicle is prodigiously branched, and abundant in flowers. It is an annual grass, frequent in some corn fields, and flowers from June to August. Horses and goats eat it; sheep refuse it. Withering.

AGROSTIS canina. *Brown Bent.*
S. 78. vinealis. W. 127. E. B. t. 1856.

From a foot to three feet high. Perennial. Meadows and moist heaths. July.

AGROSTIS litoralis. *Seaside-bent.*
W. 129. t. 23. S. 78. E. B. t. 1251.

Salt-marshes. Perennial; August.

AGROSTIS setacea. *Bristly Bent.*
S. 79. C. 6. t. 12. E. B. t. 1188.

Dry heaths. Perennial; July and August.

This is Hudson's *canina* β and γ, and Withering's *alpina.*

AGROSTIS rubra. *Red Bent.*
Alopecurus ventricosus. H. ed. 2. 28.
Milium lendigerum. *Panic Millet-grass.*
Linn. S. 76. W. 122.
Corn-fields. Annual; August.

AGROSTIS capillaris. *Fine Bent.*

A. vulgaris. E. B. t. 1671. S. 79. W. 132. Item, canina W. 127. polymorpha α. H. 31.

Perennial; flowering in July.

It is totally different from the *capillaris* of Linnæus. It is disliked by cattle, as are the bents in general. Swayne.

AGROSTIS stolonifera. *Creeping Bent.*

W. 131. M. 120. S. 80. E. B. t. 1532.

Perennial; moist fields and meadows, flowering from June to August. It is Hudson's *polymorpha* δ.

AGROSTIS palustris. *Marsh Bent.*

A. alba. Linn. S. 81. W. 129.

A. polymorpha ζ. H. 32.

Perennial. Ditches and marshes. July.

AGROSTIS sylvatica. *Wood Bent.*

This is only a variety of the preceding, growing in moist woods.

It is the *sylvatica* of Linnæus, *polymorpha* η of Hudson, and is known by the name of *Running Twitch* in some counties.

AGROSTIS minima. *Smallest Bent.* S. 82. W 134.

Knappia agrostidea. E. B. t. 1127.

Annual. Sandy pastures, near the sea-coast, flowering in March and April. Found by Mr. Stillingfleet in Wales. It is only from one to three inches in height.

Aira cristata. *Crested Hair-grass.* E. B. t. 648. S. 83.
Poa cristata. W. 145.

Perennial. Dry pastures, by way and wood sides in barren land, and on walls; flowering from June to August.

Aira cærulea. *Purple Hair-grass.*
Melica cærulea. *Purple Melic-grass.*
Linn. mant. 325. S. 93. W. 139. Curt. Lond. 5. t. 11. E. B. t. 750.

Perennial. Common on wet moors and heaths; flowering from July to the end of September. Harsh and late. Horses, sheep, and goats eat it. Chermes graminis was found upon it. Linn. In the turf moors below Glastonbury, Somerset, in great abundance. The country people make from the straw of this grass a neat kind of besoms, which they sell to the housewives in the neighbourhood as a cheap and no despicable substitute for hair-brooms. Swayne. Flourishes in the neighbourhood of the copper-works at Pary's mountain in Anglesea, while almost all other vegetables, even lichens, are injured or destroyed. Penn. Wales, II. 265.

Aira aquatica. *Water Hair-grass* *.
C. 1. t. 5. W. 135. S. 84. E. B. t. 1557.

Perennial. In watery places and on the banks of rivers; flowering in May and June.

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* Water-hair, a sweet grass abounding with sugar, and excellent for butter and cheese; but cannot be easily cultivated because it requires water to grow in. It contributes to the sweetness of Cottenham cheese, and the fineness of Cambridge-butter. Sole.

Aira cespitosa. *Turfy Hair-grass.*

W. 136. S. 84. E. B. t. 1453.

Meadows and moist woods, in large tufts, occasioning tussocks or hassocks, as they are vulgarly called. In marshes it is frequently viviparous. Perennial; flowering in June and July. Its leaves are the roughest and coarsest of all the grasses, and therefore cattle will seldom touch them, unless forced by hunger. Swayne.

Aira flexuosa. *Mountain Hair-grass.*

W. 136. S. 85. E. B. t. 1519.

Perennial. Heaths, barren pastures, and rocky moors. Flowering in July.

A. montana H. 35. W. 136. is a variety of this; but it is not *A. montana* of Linnæus.—A. setacea, *small-leaved hair-grass* of Hudson's first edition, adopted by Stillingfleet, differs not from the latter, according to Dr. Smith.

Aira canescens. *Grey Hair-grass.*

W. 137. t. 24. S. 86. E. B. t. 1190.

Perennial. Sandy coasts: flowering in July, according to Mr. Sole. An excellent sheep-grass, scarcely inferior to sheep's fescue, but difficult to raise, because it affects sand and sea-air.

Aira præcox. *Early Hair-grass.*

C. 3. t. 7. W. 137. S. 87. E. B. t. 1296.

A small annual grass, two or three inches high, in good ground, attaining to a span. It has a sweetish taste, and cattle and sheep seem to be fond of it. Flowers in May and June.

AIRA caryophyllea. *Silver Hair-grass.*

C. 6. t. 6. W. 138. S. 88. E. B. t. 812.

This also is a small annual grass, from two to nine inches high, frequent on sandy pastures and heaths; flowering in July.

These grasses are quite insignificant in culture.

MELICA uniflora. *Wood Melic.*

S. 91. W. 139. C. 5. t. 10. M. 64. E. B. t. 1058.

M. nutans. H. 37.

Perennial. Woods and among bushes; flowering in May and June. This is the *M. nutans* of Stillingfleet.

MELICA nutans. *Mountain Melic.*

S. 92. W. 138. Curt. Lond. 6. t. 4. M. 65. E. B. t. 1059.

M. montana. H. 37.

Perennial. Northern Counties, in rocky shady situations; flowering from June to August. Neither of these grasses is of any use in husbandry.

BRIZA minor. *Small Quaking-grass.*

W. 148. S. 108. E. B. t. 1316.

Annual. Western Counties, Jersey and Guernsey, in corn-fields; very rare; flowering in July.

BRIZA media. *Common Quaking-grass.*

W. 148. S. 109. M. 39. E. B. t. 340.

Perennial. Frequent in pastures, especially dry ones; flowering in May and June.

Cattle eat it, but it has no peculiar excellence. It furnishes very little food, and generally indicates a poverty of soil. The Brizas are the prettiest of the grasses. If carefully dissected in a microscope the young plant will be found with its roots and leaves pretty perfectly formed. Swayne.

POA aquatica *. *Water* or *Reed Meadow-grass.*

C. 5. t. 12. W. 140. S. 95. E. B. t. 1315.

Perennial. Ditches and the banks of rivers; flowering in July and August.

It is one of the largest grasses. In the fens immense tracts are covered with it; and it not only affords rich pasturage in summer, but forms the chief part of their winter-fodder. It has a powerfully creeping root, and bears frequent mowing well; being sometimes cut thrice in one season. In conjunction with Cat's-tail, Burr-reed, &c. it soon fills up ditches, and even slow rivers. In the isle of Ely they cleanse these by an instrument called a Bear; which is an iron roller, with plates of iron like small spades fixed in it: this is drawn by horses on the bank, and tears up the plants, which float, and are carried down the stream.

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* "This excellent grass," says Mr. Sole, "in its native soil, the Isle of Ely, grows to the height of six feet; it is usually cut when four feet high, and when dry bound into sheaves. It is excellent fodder for milch cows." Mr. Relhan observes, "It well deserves the attention of the agriculturist, as great relief was derived from it a few years ago in Cambridgeshire, when a supply from Ely removed the distress occasioned by want of hay. It requires a rich wet soil, and is rather impatient of cold, being rarely found in the Northern counties of England."

POA distans. *Reflexed Meadow-grass.*

S. 96. W. 141. t. 25. E. B. t. 986.

Perennial. Frequent near the sea-coast; flowering in July.

POA procumbens. *Procumbent Sea Meadow-grass.*

S. 98. C. 6. t. 11. E. B. t. 532.

Annual. Salt-marshes. July and August.

POA alpina. *Alpine Meadow-grass* *.

S. 100. E. B. t. 1003.

Perennial. Mountains of Scotland. July.

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* "This grass, Poa alpina, is new to the agriculturist. I first found it in 1788, on a high rock, called Corbie Cragg, in the parish of Tannadiu, and among stones near Airly Castle, in Angusshire. It is also found near the summit of several of the Highland Alps; but in these very elevated situations it is always viviparous; that is, its flowers become perfect minute plants, which drop off and strike root in the ground; an admirable provision of nature for the propagation of the plant in such alpine regions, where the severity and continual moistness of the climate would in general prevent the seeds from

Poa flexuosa. *Zig-zag Meadow-grass.*
S. 101. E. B. t. 1123.
Perennial. Mountains of Scotland. July.

Poa cæsia. *Sea-green Meadow-grass.*
S. 103. E. B. t. 1719.
Perennial. Mountains of Scotland. June and July.

Poa trivialis *. *Common* or *roughish Meadow.*
C. 2. t. 6. W. 143. S. 103. E. B. t. 1072.

Stems decumbent at the base, and rooting, a foot and half or two feet high: the whole plant roughish. Spike-

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ripening. Even in the most lofty and barren situations this plant would make excellent pasture; and I am certain that many soils and situations, which could never be turned to account otherwise, might be rendered valuable as pasture by the introduction of this grass. It forms a good foggage, and even continues to grow through the winter. In short, the Poa alpina is one of the best grasses for establishing a green sod for pasture on up-land grounds, where few good grasses would vegetate. It is true, that a hay-crop could not be expected from it; but would it not amply repay the expence of labour by converting sterile heaths into profitable sheep-walks and green fields for cattle? The enterprising and ingenious farmer might thus be enabled to improve immense tracts, at present not worth a shilling each acre annually, but which might, in many cases, become of fifty times that value."

Donn's excellent Observations on some of the indigenous grasses of Britain which seem deserving of culture for pasture or hay. Art. *Poa Alpina*. In the Prize Essays and Transactions of the Highland Society. Vol. III.

* I have attempted, says Anderson, to save seeds of the Poa trivialis for two years successively; but have never been able to get

lets three-flowered most commonly. Stipule elongated, lanceolate, acute. Perennial. Moist meadows or the banks of ditches. June to September.

It is one of our best grasses, for it produces a great quantity of sweet tender leaves, and is early. It does not bear frost so well, nor does it shoot so early in the spring as the *pratensis;* but as the weather becomes warmer it grows faster, and produces a greater crop of

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them in any other way than by gathering with the hand, which is a troublesome, tedious, and uncertain operation.

This is perhaps one of the most valuable pasture-grasses; and therefore merits a more than ordinary degree of attention to try if the seeds can be obtained in such quantities as to be useful to the farmer. The only probable way of succeeding will be to sow some of the seeds upon a clean piece of ground naturally dry and not very rich. If it were once established on such a soil it would produce abundance of seeds every season, and it would scarcely be rotted before the seeds were ripe. But as the leaves are for the most part higher than the stalks before the time of cutting, and are extremely succulent when cut, it will be proper to make the whole of this scanty crop into hay, rick it till the spring, and then thresh it out. The seeds are light and chaffy, and neither easily separated from the stalk nor distinguished from the hay, so care must be taken that the threshing and shaking are carefully performed. Or, what would be better, cut the hay by means of a chaff-cutter, and strew the whole thickly over the field. As it is an abiding grass, it is worthy of some expence and trouble to get it most firmly established. These observations are in some measure applicable to the Poa tribe.

The leaves of the Poas are remarkably tender and succulent, which renders them particularly proper food for cattle, which delight much in succulent food, as sheep in dry pasture.

The seeds of the whole tribe are entangled together by the web-like filaments already mentioned.

Anderson's Essays on Agriculture, vol. II. p. 224.

bottom leaves than most others. Seven pounds will sow an acre. Turkies, observes Mr. Stillingfleet, will eat the seeds.

Poa setacea of Hudson's first edition, adopted by Mr. Stillingfleet, is a variety of this species, according to Dr. Smith. According to Arthur Young it is an excellent grass for rich loams. Ann. Agr. V. III.

Poa pratensis. *Great* or *Smooth-stalked Meadow-grass.*

C. 2. t. 5. W. 141. S. 104. E. B. t. 1074.

This, which resembles the preceding, may be distinguished by attending to the following circumstances. It is in every part smooth; whereas in the *trivialis* the stalk, the leaves with their sheath, and the branches of the panicle, all feel rough, if the plant be drawn downward betwixt the thumb and finger: the root is creeping, and sends out many white shoots; but in the *trivialis* it is simply fibrous: the stipule is very short and blunt: the spikelets have four or five florets: it grows commonly on walls or dry banks, but often in meadows: it flowers about the third week in May; and after it has once flowered, shows no disposition to do so again: whilst the *trivialis* is found in bloom, though not generally, during the whole of the summer: there is also a firmness in the stalk of this which is not perceptible in the *trivialis*. For these accurate distinctions we are chiefly indebted to Mr. Curtis.

Dr. Withering informs us, that *Poa pratensis* constitutes a considerable part of the herbage in the rich meadows of the flat parts of Somersetshire. Mr. Swayne observes, that in meadows which have been flooded the whole winter it flourishes so as nearly to exclude every other grass. These two Poas seem to have been greater favourites with Miller and Curtis than with Stillingfleet. The former strongly recommended their seeds to be carefully collected, and sown separately. According to Curtis, where early pasturage is desired, it cannot better be obtained than by a combination of this and Meadow Fox-tail, with sweet-scented Vernal-grass: but if crop be an object, the Fox-tail should predominate. "This is the most noble of all the grasses," observes Mr. Sole, "agriculturally considered, as it makes the best hay, and affords the richest pasture, and all cattle are fond of it. It has likewise the good qualification of abiding in the same ground everlastingly; whereas most other grasses are ever changing."

Dr. Smith considers *Poa angustifolia* of Linnæus as a variety of the *pratensis*; differing only in having the lower leaves very narrow and stiffish, the panicle smaller, and the lower sheaths somewhat rugged.

Dr. Smith has made a species of Hudson's *pratensis* β, under the name of

POA humilis. *Short blueish Meadow-grass.* S. 1387.
P. subcœrulea. E. B. t. 1004.

Very distinct from *P. alpina*, in having the florets connected by villose hairs, as in the *pratensis* and *trivialis*; all the stipules very short, and the root creeping. Perennial. Mountain pastures; flowering in June.

POA compressa. *Flat-stalked Meadow-grass.*
W. 147. E. B. t. 365. S. 99.

Root perennial, creeping. Remarkable for its very flatted stalk, which is decumbent at the base, then rises obliquely, and is upright towards the top. Stipule short, bluntish. Panicle all directed one way, condensed, two inches long; the branchlets, as they flower, spreading considerably, but afterwards becoming again close-pressed to the main branch. Spikelets much larger than in the *pratensis*. Florets from three to nine, but mostly three or four, angular, connected at the base by very fine short complicated hairs. Dry pastures, walls, house-tops, and other dry places; flowering from June to September.

It can scarcely be put to any agricultural use, though all cattle eat it; for it does not thrive in moist or manured ground, and there are many better grasses for dry situations. "It is, however," observes Mr. Sole, "an excellent grass for parks and sheep-walks, deer and sheep being fond of it; and as it is a dwarf-grass it makes a fine turf."

POA bulbosa. *Bulbous Meadow-grass.*
E. B. t. 1071. S. 102.

Root perennial, with clusters of bulbs. Spikelets commonly four-flowered. Florets connected at the base by complicated villous hairs. Pastures; flowering in May and June.

POA annua. *Annual Meadow-grass.*

C. 1. t. 6. M. 98. W. 143. S. 105. E. B. t. 1141.

Stalk oblique, flattened. Panicle straddling. Spikelets ovate, three to five flowered. Florets rather remote, five-nerved, not connected by hairs at the base. Distinguished from *P. trivialis* by its general habit, spreading panicle, reclining stalks, its smoothness, and greater softness and delicacy; from *P. pratensis*, by having the branches, or peduncles, in pairs; its panicle more thinly set, and its spikelets larger: from both by its inferior size, compressed stalks, annual root having the property of throwing out new shoots, and florets distinct.

If *gramen* be so named, says Ray, *à gradiendo*, or *progrediendo*, no species better merits the name than Annual Meadow-grass; for it differs from all other annual grasses, in continually throwing out new shoots, and producing fresh flowers and seeds, insomuch that if the ground be moist a single plant will grow in this manner throughout the year; and we generally find on the same plant young shoots and ripe seeds. It is common to every quarter of the globe, in meadows, gardens, by the sides of paths, and on walls; flowering all the summer, and even in the winter, if the weather be mild. It appears to be one of the first general coverings which nature has provided for earth made bare from any cause. In walks, pavement, and pitching, it is one of our most troublesome weeds: in such situations the most expeditious way of destroying it is by pouring on boiling water.

Its foliage is tender, and grateful to cattle, but it never acquires any great height: it is also liable to be killed by winter's frost and summer's drought. May or June is the best time to gather the seed in greatest abundance: but, as a single tuft may be divided into a great number of plants, and as they grow with wonderful facility, an experiment, on a small scale at least, might be thus tried, by transplantation in moist weather *.

POA nemoralis. *Wood Meadow-grass.*

W. 146. S. 106. E. B. t. 1265.

Perennial. June. Most plentiful in the North of England. *Angustifolia β.* of Hudson, 41. There is a variety of it (angustifolia α of Hudson) that has a firmer habit, the stem and leaves less attenuated, the panicle denser, and the florets commonly more numerous. It very much resembles *poa pratensis* and *trivialis*; but the florets are not connected by woolly hairs, and there are other marks of distinction.

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* It succeeds, observes Mr. Donn, beyond any other grass in moist and rich soils; in the meadow under Edinburgh castle; and in that under Salisbury Craggs. It is cut six or eight times every season.

Dr. Smith (1388) has a species, which he names (from *Flora Danica*, 964. *W.* 148.) *Poa glauca*, E. B. t. 1720. It differs from the *nemoralis*, not only in its glaucous colour, but in its less slender habit, stiff upright panicle, and in the florets being blunter, coloured, and scarcely nerved. It is perennial, native of the Welsh mountains, and flowers in June and July.

POA maritima. *Creeping Sea Meadow-grass.*

W. 147. S. 97. E. B. t. 1140.

Perennial. Salt-marshes. Flowering in July. It resembles the *distans* very much; but differs from it in having a creeping root, and the florets longer and more acute; by no means retuse. It is a fine nourishing grass, says Mr. Sole, and one of the principal of our best salt-marshes.

POA rigida. *Hard Meadow-grass.*

C. 2. t. 4. W. 146. S. 99. E. B. t. 1371.

Annual. Frequent on walls, and in sandy grounds: flowering in June. Unworthy of cultivation because destitute of radical leaves.

FESTUCA ovina. *Sheep's Fescue-grass.*

W. 152. M. 102. E. B. t. 585. S. 113.

A small grass, scarcely exceeding six inches in height; a very sweet feed, as far as it goes, on sheep downs, where however its foliage is hard and wiry, and its produce trifling. Sown in a rich soil it would become larger and more succulent, but can never be productive as a mowing grass: in such a soil also the native grasses would quickly overpower it. Mr. Curtis recommends it for making a fine grass-plat. It is perennial, and flowers in June and July.

FESTUCA vivipara. *Viviparous Fescue.*

S. 114. E. B. *t.* 1355.

Said to be distinct from the preceding, and always viviparous. On the mountains of Yorkshire, Scotland, and Wales. Perennial. July.

FESTUCA duriuscula. *Hard Fescue.*

W. 153. E. B. t. 470. S. 115.

Perennial. From a foot to two feet in height. In dry pastures: flowering in June. Seems preferable to *F. ovina* for sheep; being somewhat earlier, and more productive. This species was mistaken by Mr. Stillingfleet for the *rubra.*

FESTUCA rubra. *Purple* or *creeping Fescue.*

W. 153. S. 116. R. 413. t. 19. f. 1.

Perennial. High heaths and dry pastures, also on sandy coasts: flowering in July. Distinguished by its widely creeping roots. By no means so common as the preceding. Like the ARUNDO *arenaria*, it tends to arrest the progress of sand on the sea-shore, and often prevents it from overwhelming great tracts of the neighbouring soil.

FESTUCA bromoides. *Barren Fescue.*

W. 151. S. 117. E. B. t. 1411.

Annual. On walls, and in sandy pastures. Flowering in June and July; and varying very much in size.

FESTUCA myurus. *Wall Fescue.*

W. 151. S. 118. E. B. t. 1412.

Annual. On walls and in barren places: flowering in June. Resembling the preceding, but differing in having the leaves less bristle-shaped; the stalk commonly higher; the panicle four times as long, branched and nodding.

FESTUCA uniglumis. *Single-husked Fescue.*

S. 118. E. B. t. 1430.

Annual or biennial. Sandy coasts. June. *Lolium bromoides* Huds. But it has no affinity with Lolium.

FESTUCA calamaria. *Reed-like Fescue.*

S. 121 & 1389. E. B. t. 1005.

Perennial. Woods, at the foot of the Scotch mountains, Worcestershire, and Ireland: flowering in July. It has been confounded with the following.

FESTUCA elatior. *Tall Fescue.*

C. 6. t. 7. W. 155. S. 124. E. B. t. 1593.

Perennial. Wet meadows and woods, on the banks of rivers and ditches, and in osier grounds; flowering in June and July.

It grows in large tufts, and is conspicuous by the breadth of its leaves, the height of its stems, and the drooping of its panicle at least before it flowers. In marshes it grows to four feet in height, is hardy and very productive; but too harsh and coarse for hay: yet, in the opinion of Mr. Curtis, it may perhaps be a good grass for soils which cannot be drained, of too much moisture, or which are apt to be overflowed.

FESTUCA decumbens. *Small* or *decumbent Fescue.*

Poa decumbens. S. 107. W. 147. E. B. t. 792.

Perennial. Barren moistish pastures, especially in boggy parts on high ground: flowering in July.

FESTUCA fluitans. *Flote Fescue.*

W. 156. M. 113. C. 1. 7.

Poa fluitans. S. 95. R. 32.

Perennial, the root striking deep into mud. Common in ditches, watery places, and slow streams: flowering all the summer. This grass was always considered as a

Festuca, till Mr. Salisbury and Dr. Smith removed it into the genus POA, with which it certainly agrees in the fructification.

Horses, kine, and hogs are fond of this grass. Fish and water-fowl are greedy of the seeds; on account of its sweetness and productiveness. Flote fescue has been recommended to be sowed on meadows that admit flooding; but Mr. Curtis justly remarks, that it will not flourish except on land that is constantly under water, or converted into a swamp. This is undoubtedly a valuable grass. It grows luxuriantly, and is very vigorous during the whole summer. Cattle will venture great depths to obtain it, and it forms, with the POA *aquatica*, the *Reed* MEADOW grass, the principal part of the crops in the Isle of Ely.

FESTUCA loliacea. *Spiked Fescue.*

C. 6. t. 9. W. 157. S. 122. E. B. t. 1821.

A hardy perennial of very quick growth, producing a crop somewhat similar to Ray-grass, but larger, and succeeding best in a moist soil: it is however harsh and stalky. It is usually higher than Ray-grass by about one third; the spike is from eight inches to a foot in length, bending a little towards the top; spikelets near an inch long, placed obliquely and sessile; the husk is usually two-valved, though the inner valve is very small, and sometimes wanting in some of the spikelets. When these are shorter and broader than usual, it is frequently taken for Ray-grass. But when the spike is branched it approaches nearer to *Festuca pratensis*: it may be distinguished from that by the length of its spiked panicle. It may be distinguished from every variety of *Festuca fluitans* by the sharp nerveless chaffs of the husk.

FESTUCA pratensis. *Meadow Fescue.*

C. 6. t. 7. W. 156. M. 84. S. 123. E. B. t. 1592.

Differs from *elatior*, with which it has frequently been confounded, in having only half the height, or little more; the leaves only half the breadth; the panicle shorter, and containing about half the number of flowers: the panicle is but once branched, droops but slightly, leans to one side when in flower, and the flowers all grow one way; the spikelets are somewhat flat, linear and obtuse. It is more common and less local than *elatior*, more dispersed in open meadows, and does not form such large tufts. They differ a fortnight or three weeks in their time of flowering.

Though Mr. Hudson, in the first edition of his Flora, gave this as a distinct species, yet Mr. Stillingfleet did not adopt it in his original observations on Grasses; but he was afterwards inclined to recommend it, on the authority of the Swedish writers. Mr. Hudson broached an improbable suggestion, that Flote Fescue, sown in a garden, became Spiked Fescue the first year, and this grass the second: consequently he considered it only as a variety of Flote Fescue. Mr. Curtis, who cultivated Meadow Fescue, recommends it among the six grasses which he prefers before all others, and particularly for land either moist or moderately dry. He celebrates it as greatly superior to Ray-grass, as being larger, more productive of foliage, very hardy, found in all soils from sand to osier-holts, and abounding in the very best meadows. It is very abundant in seeds, which are easily gathered, and grow readily. It does not produce the flowering stems earlier than about the middle of June, and is therefore a fortnight or three weeks later than Meadow Fox-tail: yet it cannot be considered as a late grass; for most of the *agrostis* genus, and Meadow Cat's-tail, flower at least three weeks later than this. Mr. Stillingfleet observed it in blow June 7, 1768.

FESTUCA sylvatica. *Wood Fescue.*

W. 158. M. 114.

Bromus sylvaticus. S. 136. E. B. t. 729.

Perennial. Common in woods and hedges; flowering in July. Removed to the genus *Bromus* by Pollich, Smith, and others, on account of the inner valve of the husk being pectinate-ciliate. Hudson, in his second edition, considered it as a variety of *Festuca pinnata.*

BROMUS secalinus. *Smooth Rye Brome-grass,* or *Field-brome.*

S. 125. E. B. t. 1171.

B. polymorphus γ. H. ed. 2. 49. W. 159.

Annual. Three feet high. Panicle scarcely half a foot long, spreading, with the peduncles mostly single;

spikelets ovate, compressed, ten-flowered (or from nine to twelve); florets distinct, subcylindrical. In corn-fields; flowering in July.

Bromus multiflorus. *Downy Rye Brome.*
S. 126. E. B. t. 1884.

Annual, with the habit of the foregoing species; but seemingly distinct. Spikelets an inch long, ovate-lanceolate, flattened, having from twelve to sixteen florets, which are subimbricate and subcylindrical. In corn-fields, but not common; flowering in July.

Bromus mollis. *Soft Brome.*
C. 1. t. 8. M. 99. S. 126. E. B. t. 1078.

Annual or biennial. Two feet high. Panicle two or three inches long, erect, close, but afterwards spreading, and finally hanging down; peduncles branched; spikelets ovate, with from five to ten florets, which are closely imbricate, depressed, nerved and pubescent; common by way sides, on banks and walls, in corn-fields, particularly among barley; in meadows and pastures, especially in a sandy soil; flowering in May and June.

It forms a principal part in many dry mowing grounds. It springs early, and the seeds are ripe at the usual time of haymaking. These being large, may contribute to render the hay nutritive; but they are said to bring on a temporary giddiness in quadrupeds; and even to be fatal to poultry. If this be true, it is an objection to the cultivation of this grass, which in other respects does not rank among the best kinds.

It is known by the name of Oat-grass among the farmers in some counties, and comes up abundantly among Saintfoin; but it wears out in this crop in the course of two or three years.

This is B. polymorphus α of Hudson; ed. 2. 48.

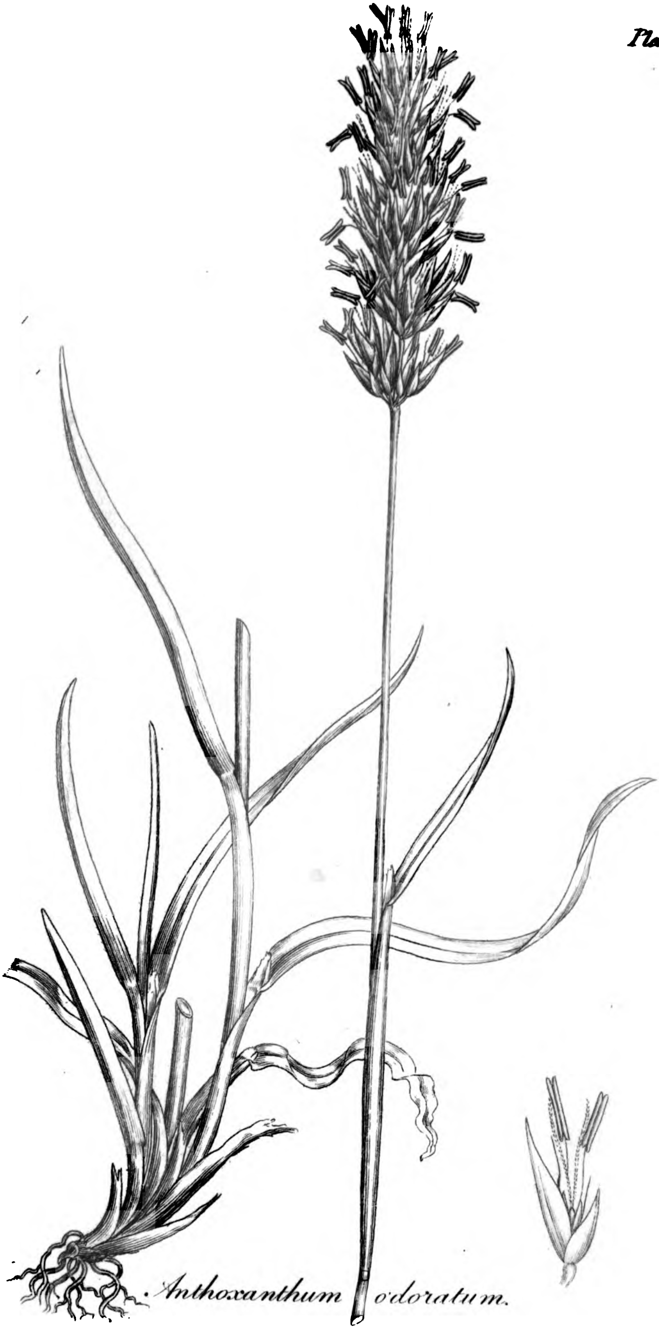
BROMUS racemosus. *Smooth Brome.*
S. 128. E. B. t. 1079.

Annual. More slender than the Soft Brome. Panicle almost upright, thin, spreading; peduncles undivided, scarcely ever two-flowered; spikelets very smooth, with six, or very seldom seven, florets; which are imbricate, depressed, nerved and smooth. Meadows and pastures: flowering in June.

This is B. polymorphus β and δ of Hudson, ed. 2. 49. W. 160.

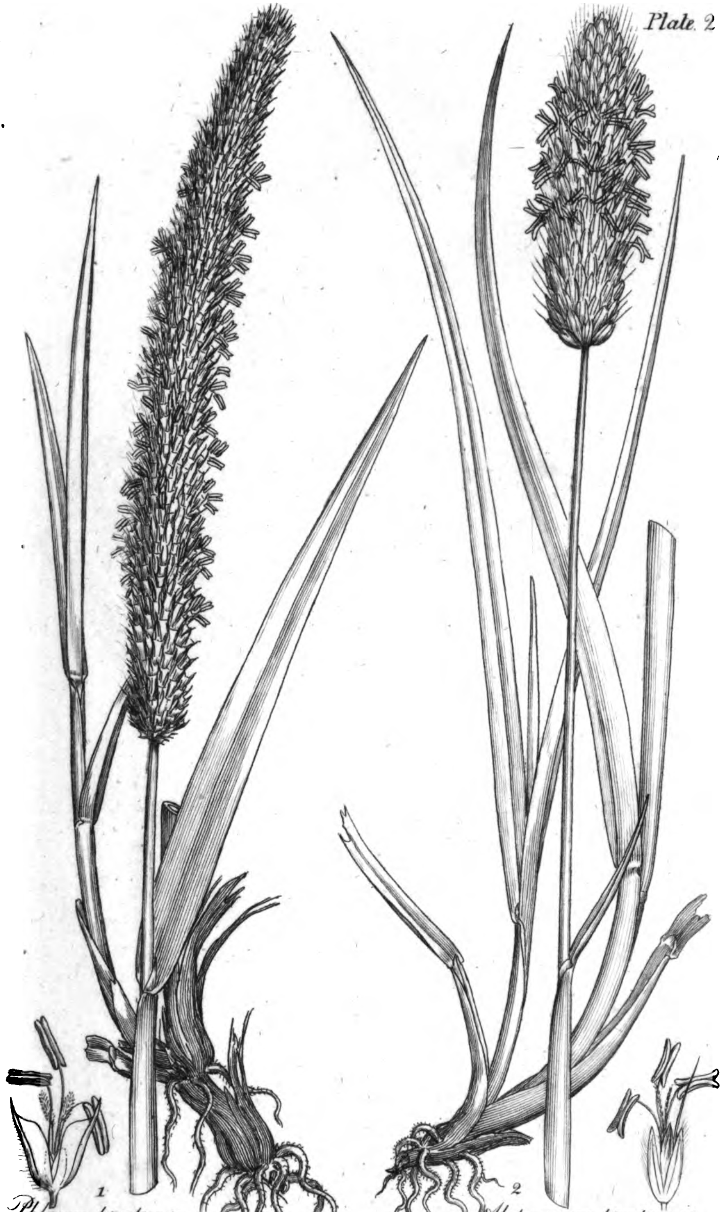
Bromus squarrosus of Hudson, ed. 2. 49. said by him to be found near Glastonbury in Somersetshire, and Marshfield in Sussex, being of very doubtful authority, is here omitted.

Plate. 1.



Anthoxanthum odoratum.

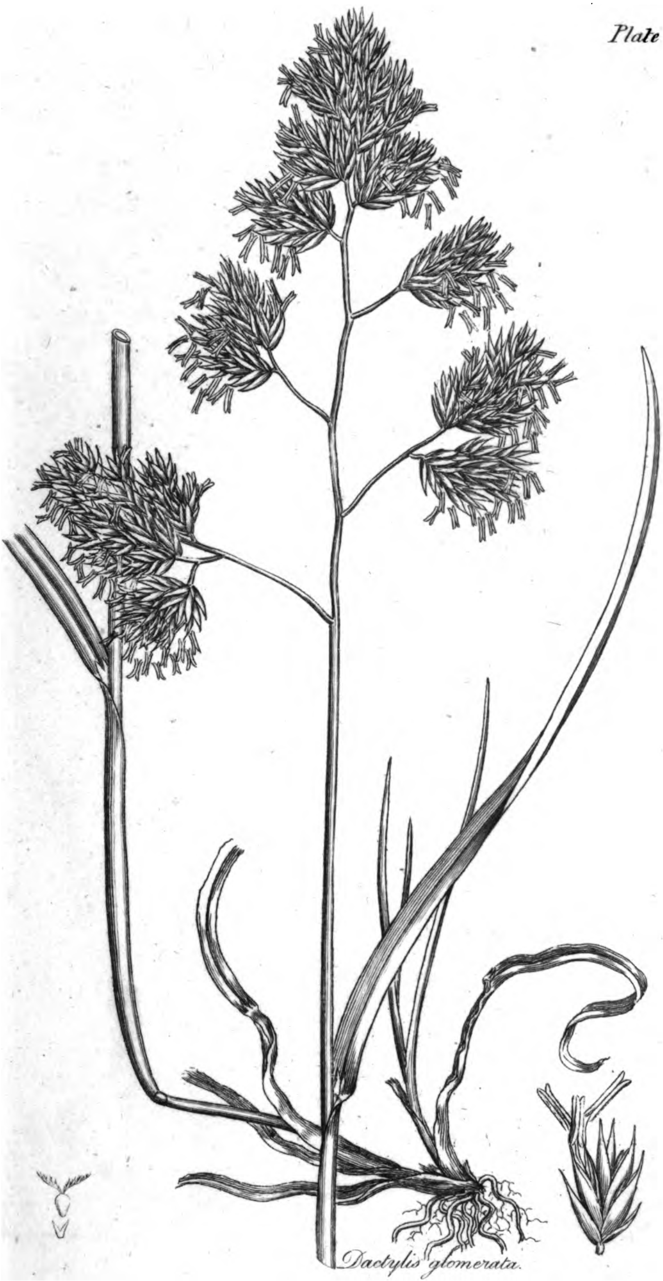
Plate. 2.



1 *Phleum pratense.*

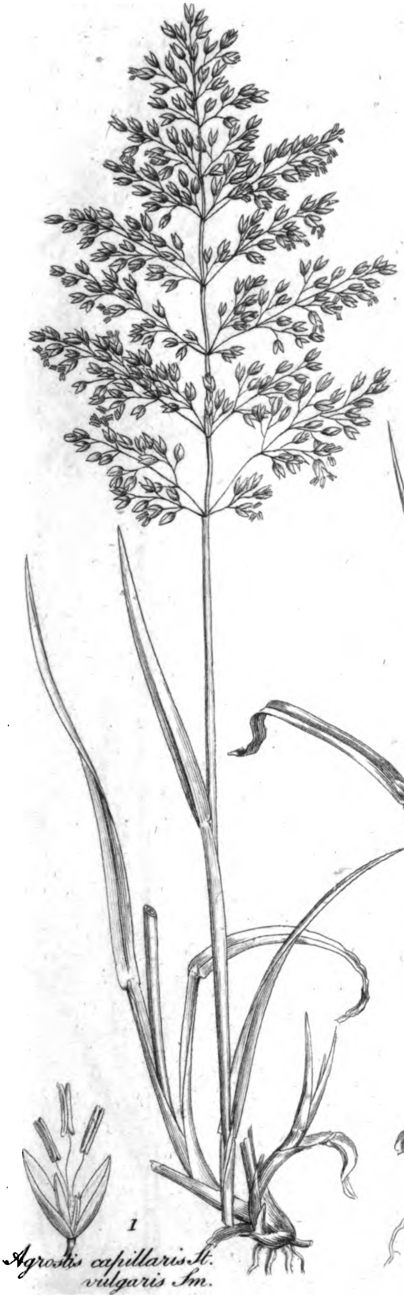
2 *Alopecurus pratensis.*

Plate .3.



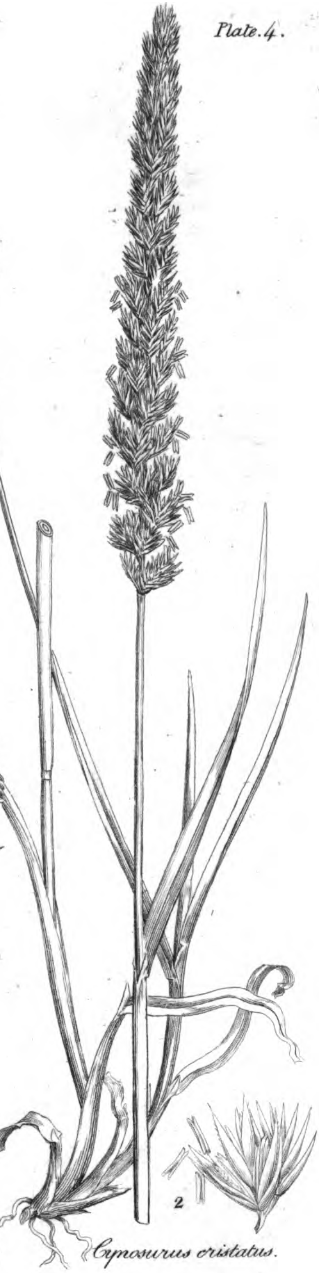
Dactylis glomerata.

Plate. 4.



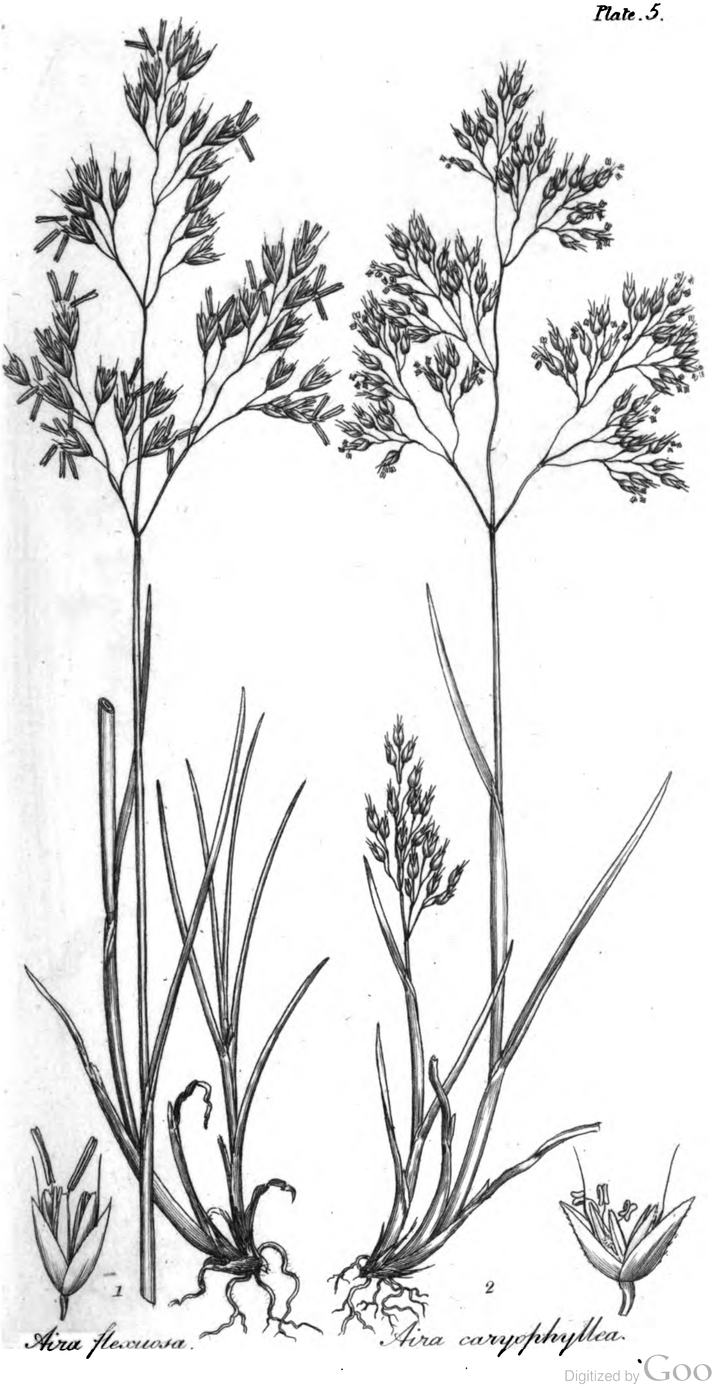
1

Agrostis capillaris St.
vulgaris Sm.



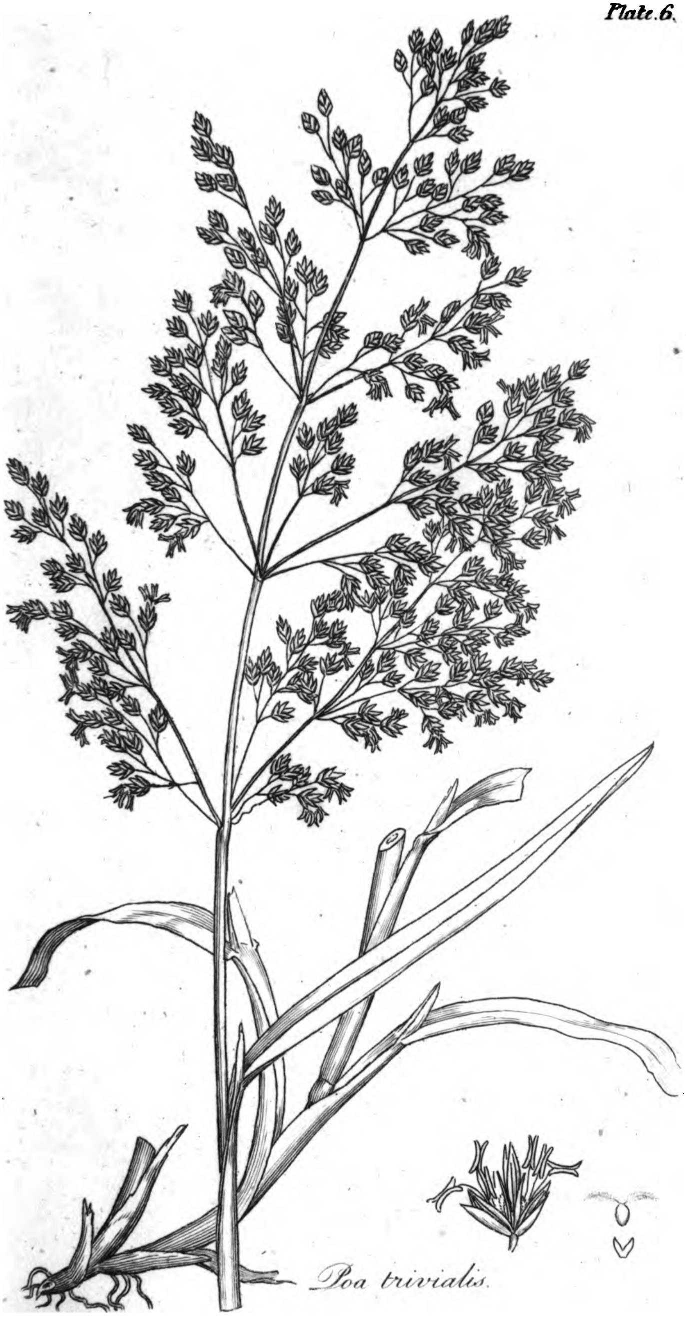
2

Cynosurus cristatus.

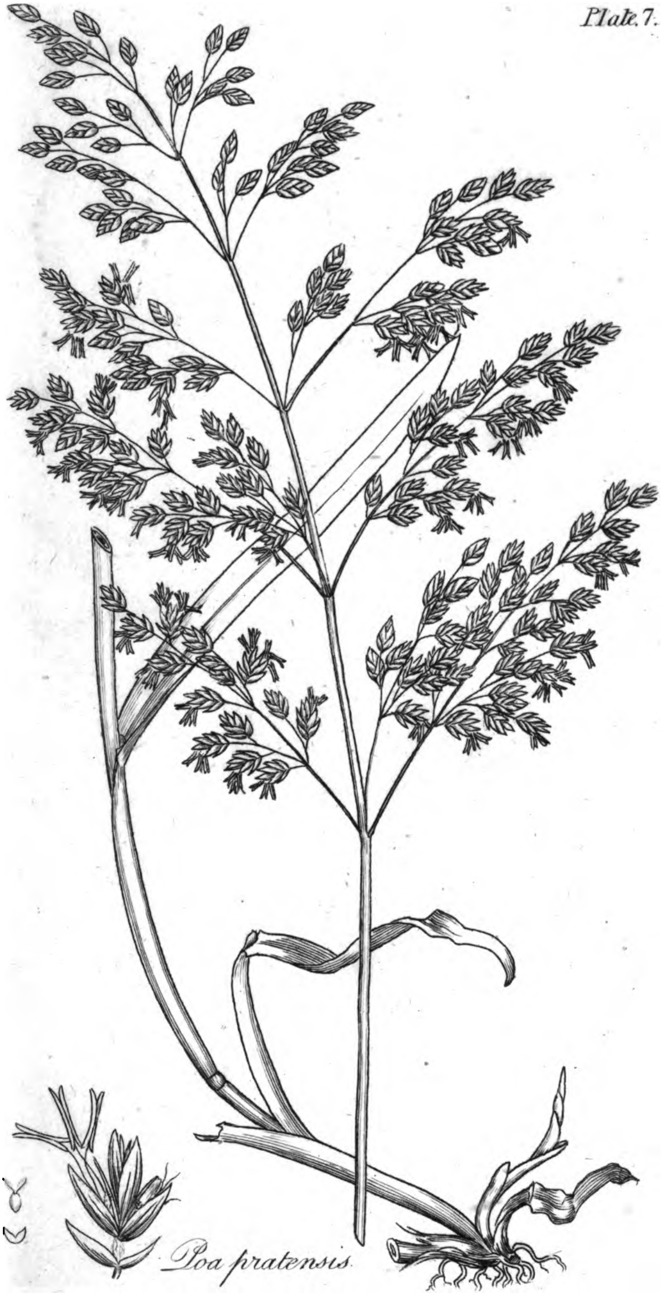


Aira flexuosa. Aira caryophyllea.

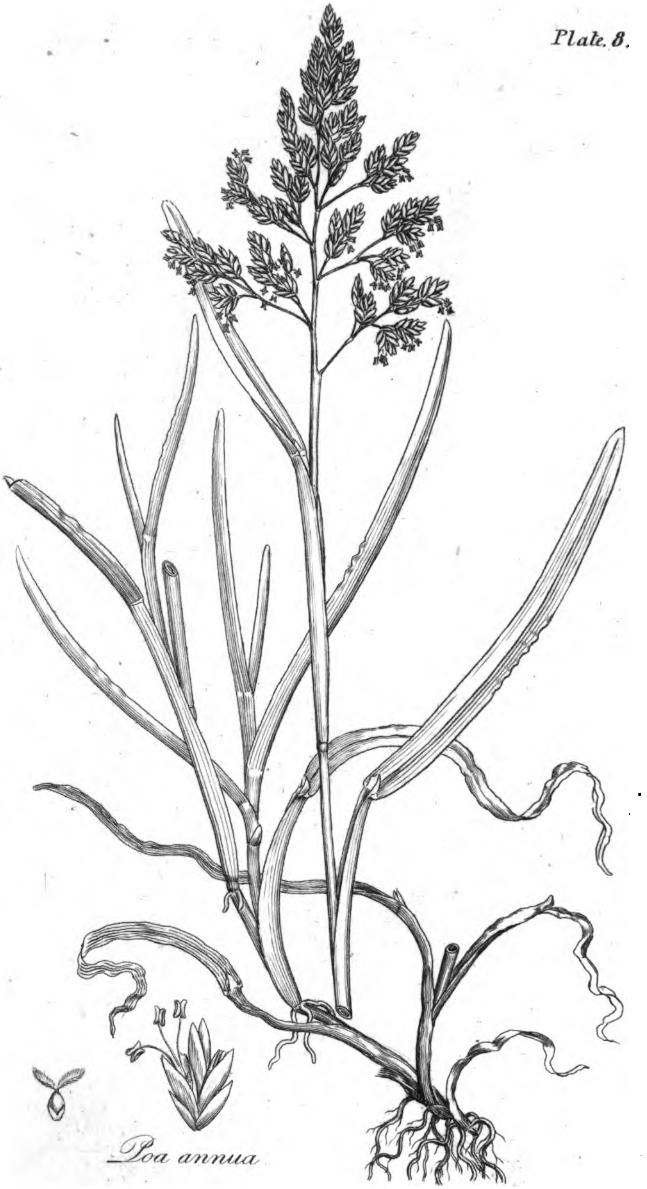
Plate 6.



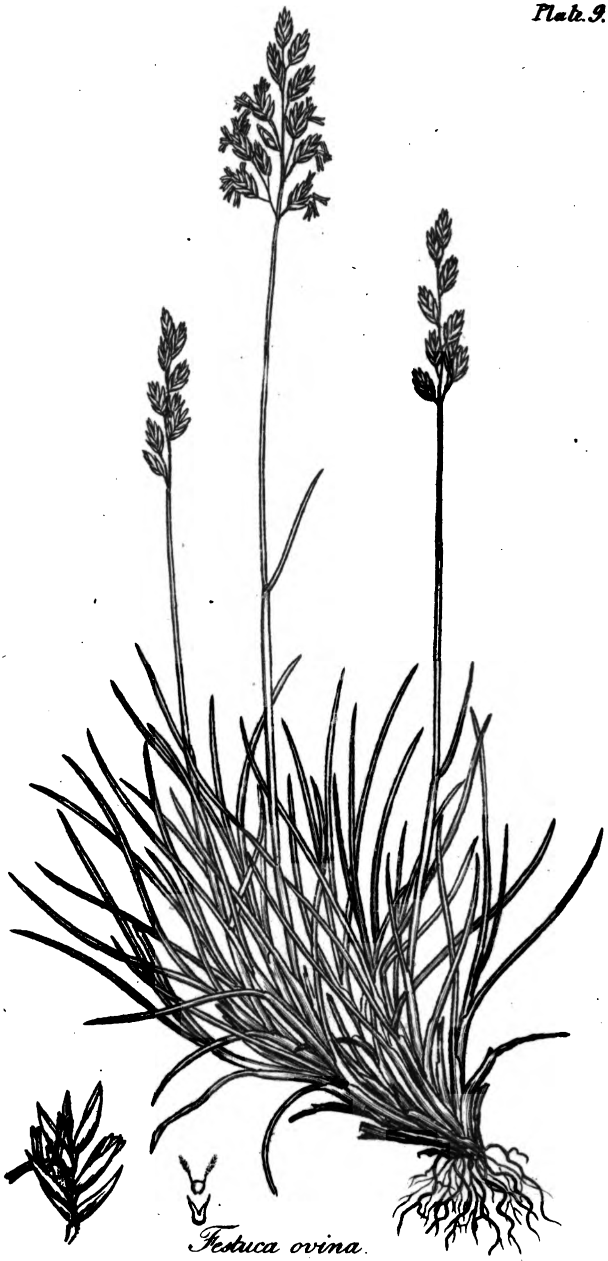
Poa trivialis.



Poa pratensis

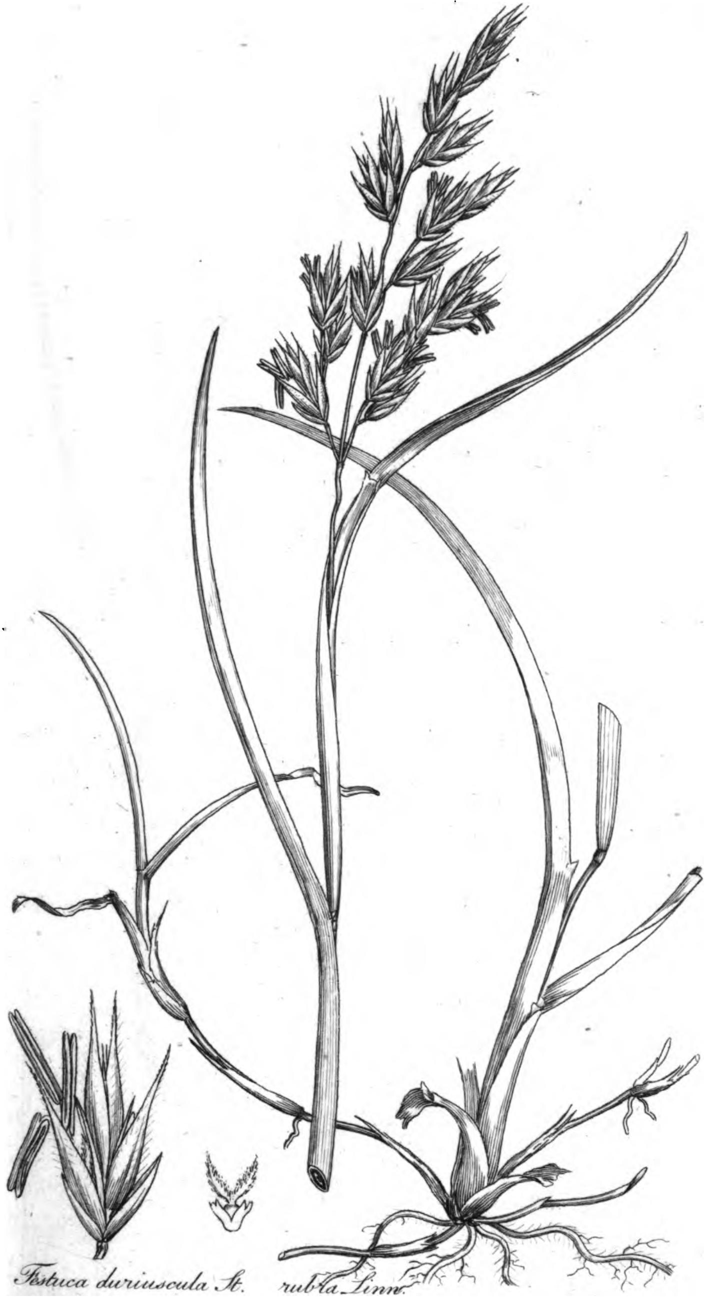


Poa annua

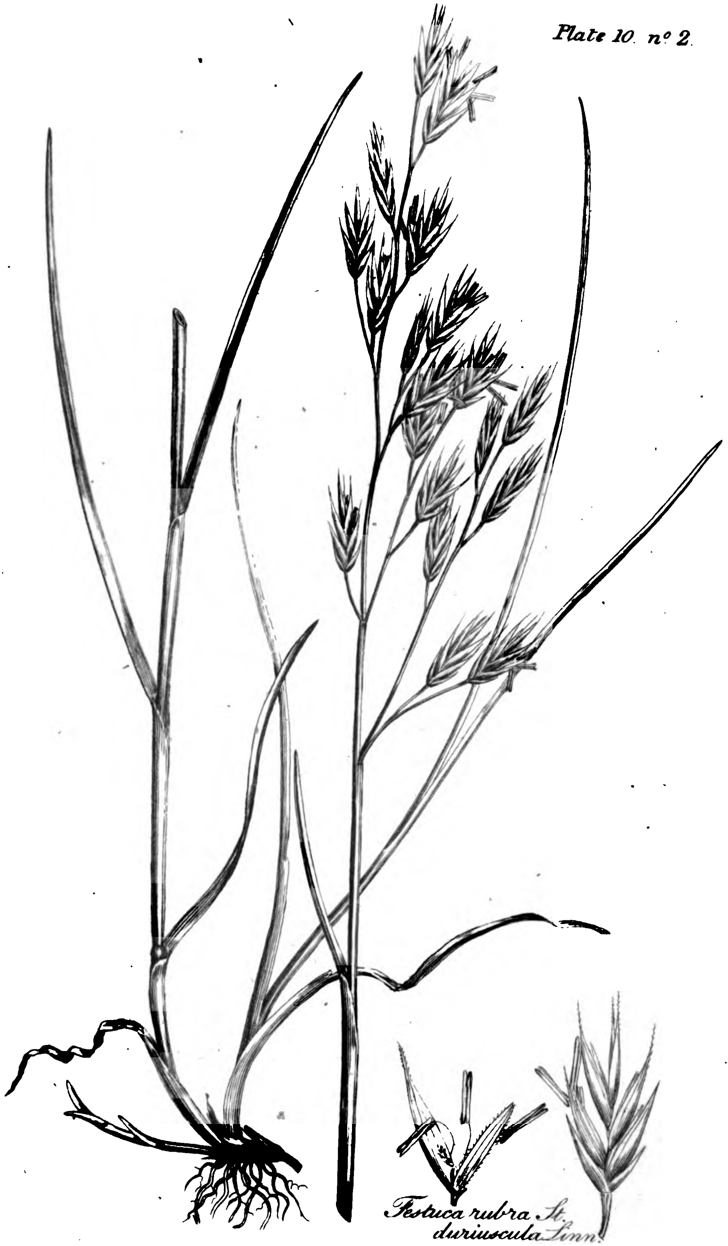


Festuca ovina.

Plate 10. nº 1.

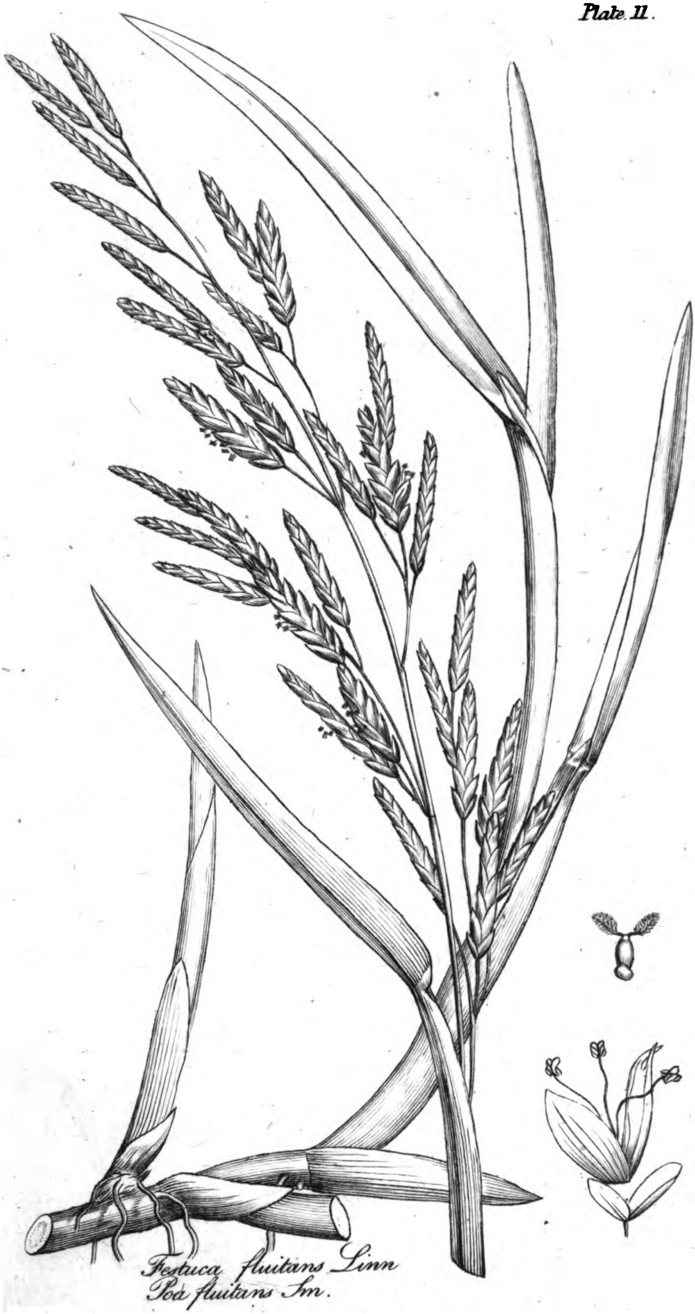


Festuca duriuscula St. rubra Linn.



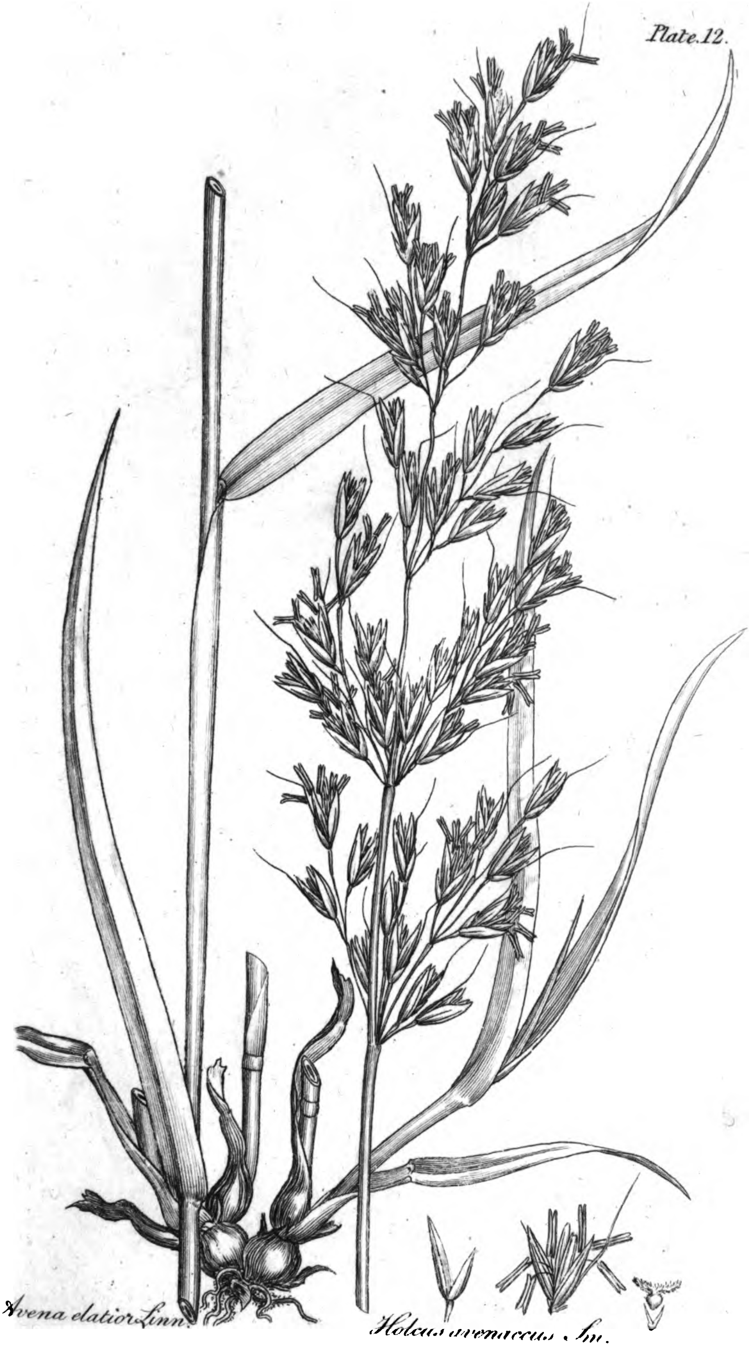
Festuca rubra St.
duriuscula Linn.

Plate 11.



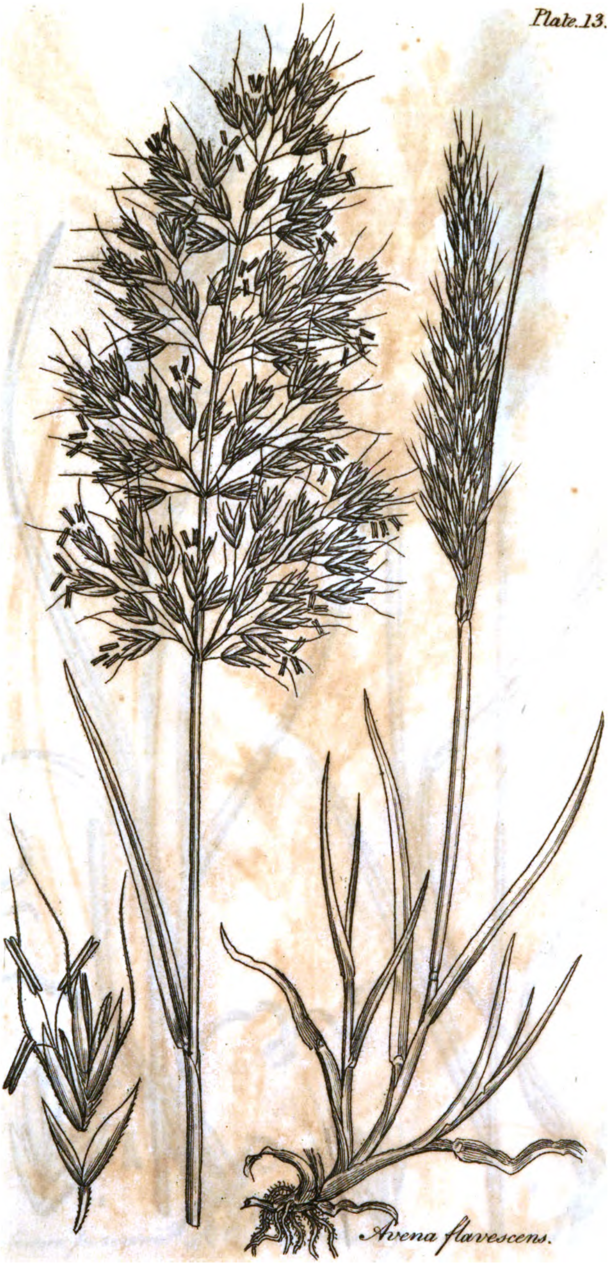
Festuca fluitans Linn
Poa fluitans Sm.

Plate. 12.



Avena elatior Linn.

Holcus avenaceus Sm.



Avena flavescens.

Plate. 14.

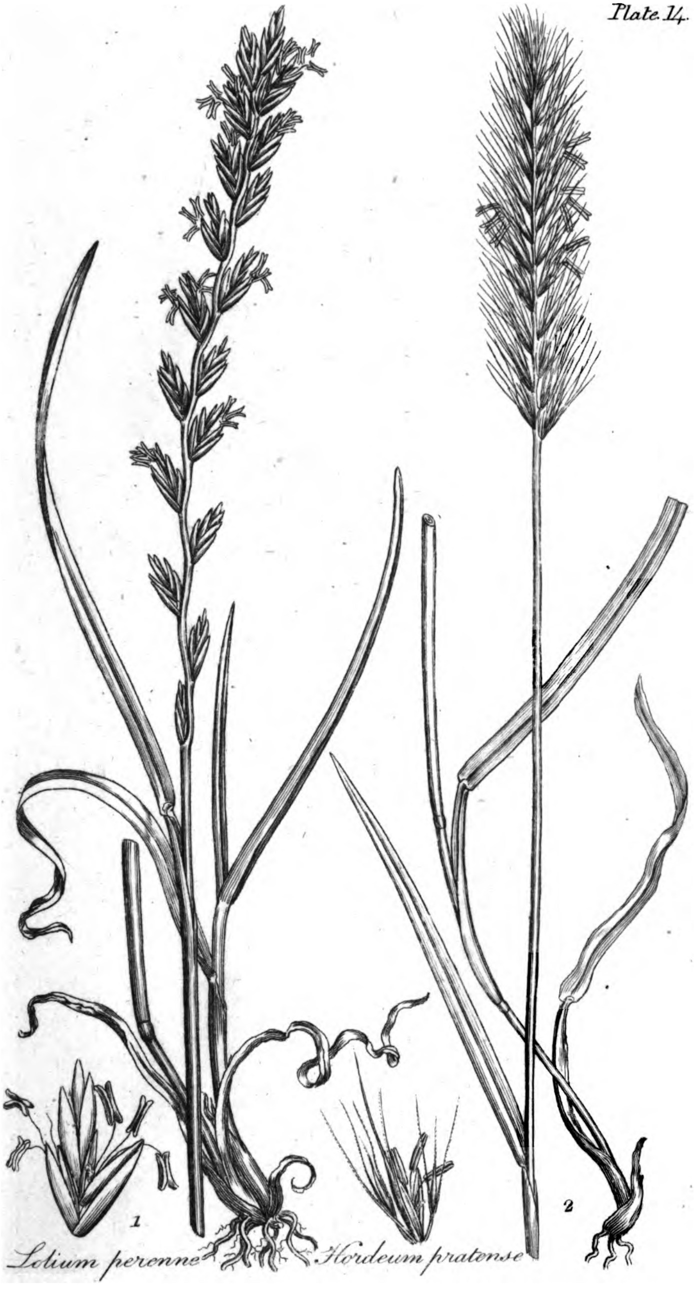
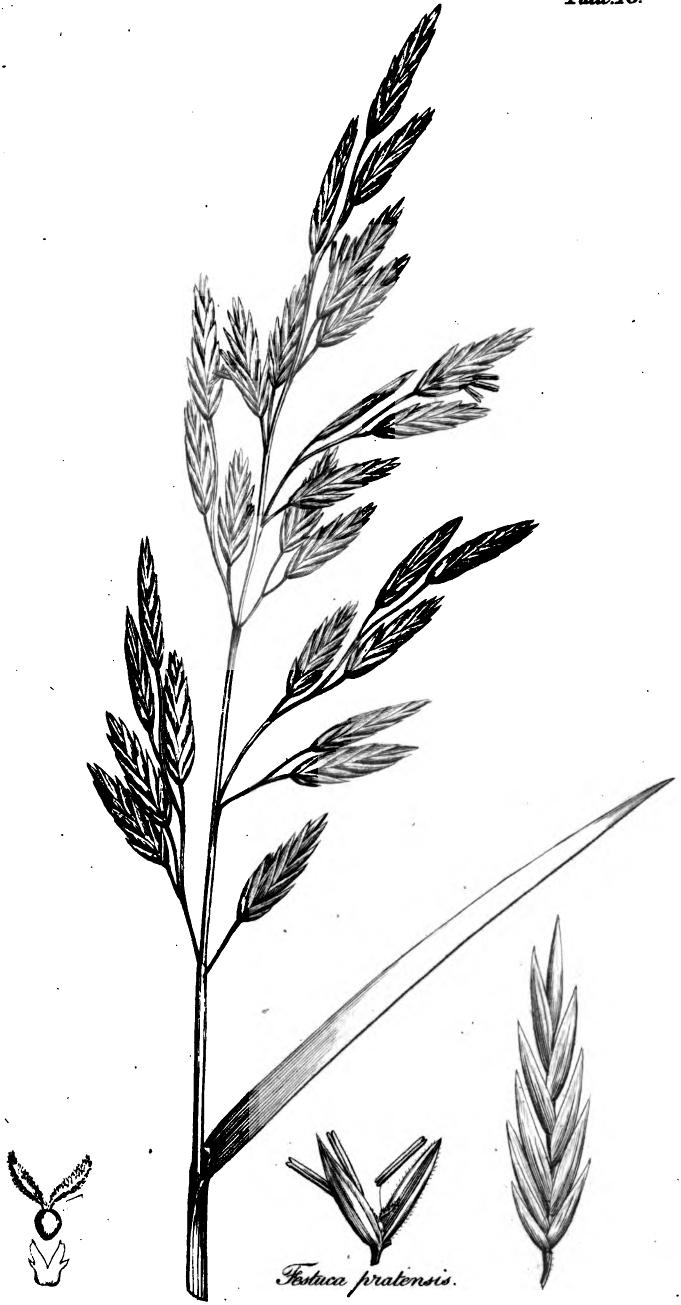
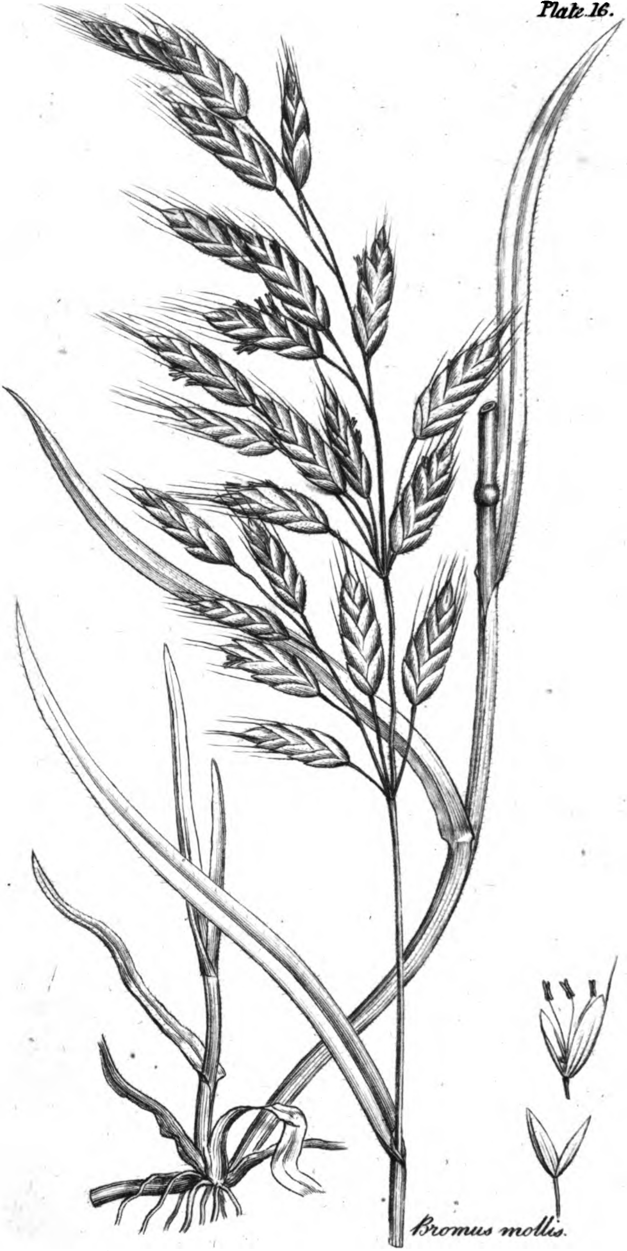


Plate.16.



Festuca pratensis.



Bromus mollis.

Bromus arvensis. *Field Brome.*

S. 130. W. 162. E. B. t. 920.

Annual. Stalk three feet high. Panicle spreading. Peduncles branched. Spikelets lanceolate, having from seven to ten florets, which are elliptic, closely imbricate, depressed, and smoothish. Corn-fields, but not common: flowering in July.

Bromus erectus. *Upright Brome.*

S. 131. W. 160. E. B. t. 471.

Perennial. Stalk near three feet high. Panicle upright. Peduncles mostly single. Florets five to nine, lanceolate, subcylindrical. The radical leaves are very narrow, with hairs set round the edge. Sandy pastures, with a substratum of chalk: flowering in July.

Bromus ciliatus. *Upright Annual Brome.*

Br. diandrus. S. 135. C. 6. 5. E. B. t. 1006.

Br. madritensis. W. 161. See a scientific description of this species in Smith's Observations on the British species of Bromus. Linnæan Transactions, vol. IV. p. 297.

Br. muralis. Hudson, ed. 2. 50.

Annual. From a foot to eighteen inches high; but varying much in size. Panicle scarcely three inches long, upright, spreading, sometimes branched. Florets lanceolate, nerved, grooved. This species is distinguished by having only two stamens to the florets. In sandy grounds, and by walls: flowering in June.

BROMUS sterilis. *Barren Brome.*

S. 134. W. 162. C. 1. 9. M. 125. E. B. t. 1030.

Annual. Stalk about eighteen inches high. Leaves hairy. Panicle large, nodding, half a foot long. Peduncles generally single. Florets six to eight in a spikelet, lanceolate, nerved, grooved. Common under hedges: flowering from May to July. Mr. Stillingfleet observed it in blow near London as early as April 20. It is a troublesome weed in saintfoin, being so soft as to let the scythe slip over it, ripening early, and very difficult to separate from saintfoin seed.

BROMUS giganteus. *Giant* or *Tall Brome.*

W. 162. C. 5. 7. Schreb. gram. 11.
Festuca gigantea. S. 120. E. B. t. 1820.

Perennial. Four feet in height. Leaves the breadth of a finger, ensiform, nerved. Panicle loose and nodding one way, a foot long, and branched. Florets from three or four to six or seven in a spikelet, lanceolate, ventricose, with long awns. In woods and under moist hedges: flowering in July and August.

BROMUS ramosus. *Hairy Wood Brome.*

Bromus asper. S. 133. W. 161. M. 126. E. B. t. 1172.

Bromus hirsutus. C. 2. 8 *.

Annual or biennial. Stalk five or six feet high. Leaves all nearly of the same breadth. Distinguished by the hairiness of the leaf-sheaths. Panicle nodding, branched. Florets about nine in a spikelet, lanceolate, subcylindrical, obscurely three-nerved. In hedges and woods: flowering from June to August. It is much too coarse a grass for cultivation.

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* "No difficulty attends this species, except what arises from the number of names that have been given it, owing to Linnæus having by accident called another B. *ramosus*, so that this requiring a new name, every person gave one according to his fancy. It is easily distinguished from B. *erectus*, to which, though no one has yet compared them, it is most nearly akin; but its annual, or at most biennial, pale smooth root, broad uniform hairy leaves, and branched drooping panicle, characterize it sufficiently. Authors have laboured to distinguish it from B. *giganteus* of Linnæus, some having most carelessly considered them as the same species. In that however the root is perennial, the spikes small, florets fewer, nearly ovate, scarcely carinated, their inner valve though rough, not ciliated, and their *aristæ*, as Villars well observes, terminal; for which two last reasons particularly I have ventured to remove it to the *Festucæ*. Smith's Observations on the British Species of Bromus. Transactions of the Linnæan Society, vol. IV. p. 295.

BROMUS pinnatus. *Spiked Heath Brome.*

S. 137. E. B. t. 730.

Festuca pinnata. Hudson, ed. 2. 48.

Perennial. Stalk eighteen inches or two feet high. Leaves commonly without hairs. Spike simple, upright, varying in length. Spikelets six to ten, sessile, distich, subcylindrical. Florets six to twelve, or even more. Awn terminating, usually shorter than the chaff. Pastures and heaths, in a calcareous soil: flowering in July.

It is not improbable that advantages might be derived from the cultivation of the BROMUS *pinnatus*, a grass hitherto neglected. It grows on the driest and most exposed parts of heaths, and sustains, without injury, the longest continuance of hot weather. It must be confessed, that it bears the appearance of being a harsh grass; but a more kindly soil would greatly improve its qualities.

Mr. Stillingfleet observes, "Along Lincoln Heath, on both sides of the town, there is scarcely any other grass than the BROMUS *pinnatus*, only mixed occasionally with the AIRA *canescens*, and AGROSTIS *capillaris*. The meadows were filled with flocks of sheep, which weigh sometimes from thirty to thirty-five pounds per quarter, as I was assured by a farmer at Waghen. Their wool is particularly good for serges and Norwich stuffs. At Waghen, near Holderness, I noticed a stalk of this grass which rose to the height of six feet and a half.

AVENA nuda. *Naked Oat.*

Is not a grass, but a grain or corn. It must have been adopted by Stillingfleet through mistake.

AVENA fatua. *Wild Oat* or *Haver.*

S. 139. W. 164. M. 81.

Annual. Stalk from three to four feet in height. Panicle very large and thin, with spreading branches, some of them dividing towards the top, from one to six at a knot, when ripe pendulous. Florets commonly three together, hairy at the base, all awned and almost nerveless. Awn strong and rough, twice as long as the husk, jointed, and twisted when dry. The seed is very hairy.

This is one of the most destructive annual weeds among corn, and is sometimes so prevalent among barley, as almost to choke it. The seed ripens and falls before harvest, thus filling the ground, where it will lie several years without vegetating. It cannot easily be extirpated but by repeated fallowing. The awns are sometimes used for hygrometers; and the seeds, instead of artificial flies, in fishing for trout.

Observe, that the Wild Oat of Southern Europe is not the *fatua*, but the *sterilis* of Linnæus.

AVENA pratensis. *Meadow* or *Narrow-leaved Oat-grass.*

S. 141. W. 165. E. B. t. 1204.

Perennial. Stalks from a foot to eighteen inches in height. Leaves narrow, rolled in, finely serrate, naked or without hairs. Spike upright. Florets four or five. Receptacle hairy under the florets. In calcareous pastures: flowering usually in July. Mr. Stillingfleet observed it in ear May 28, 1766. It abounds, he says, on the fine turf near Tunbridge, and likewise on the downs between Blandford and Woodyates Inn, on each side of the high road from Salisbury.

AVENA pubescens. *Downy Oat-grass.*

S. 140. W. 165. E. B. t. 1640.

Perennial. Leaves flat, downy. Panicle upright, nearly simple, or but little branched. Florets three, one of them frequently abortive. Common receptacle lengthened out above the florets, with white hairs longer upwards. In dry chalky soils: flowering in June. Hardy, early, and productive.

AVENA elatior. *Tall Oat-grass.*

W. 163. C. 3. 6.

Holcus avenaceus. *Oat-like Soft-grass.*

S. 90. E. B. t. 813.

Perennial, with the root more or less knobbed. Stalks from two to three or four feet in height. Panicle from a span to a foot in length. Husks unequal, smooth. Florets two; the upper one hermaphrodite, with a short straight awn, almost at the end; the male floret sessile, with a jointed awn bent back, twice as long as the floret, inserted towards the base, and frequently having an obscure abortive pistil. On banks, in hedges, on the borders of fields, and sometimes of meadows, especially wet ones: flowering in June and July.

It is an early grass, very productive, and yields a plentiful aftermath. The stem and leaves are by no means coarse, but soft, tender, and of a pleasant taste; and it may be propagated with facility. In some arable land it is a troublesome weed *.

AVENA flavescens. *Yellow Oat.*

C. 3. t. 5. W. 165. S. 142. E. B. *t.* 952.

Root perennial, creeping a little. Stalk from one to two feet high. Leaves flat, more or less downy. Panicle loose, and spreading very much when in full flower. Calyxes containing two or three, sometimes four florets, all awned, one of them sometimes abortive. Receptacle hairy.

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* According to Mr. Swayne, it is unpalatable to cattle, especially horses, as are the oat-grasses in general.

It is easily distinguished from the other Avenas, by its being the least of the genus commonly known; by the panicle being finely divided, and of a yellower hue; the spikelets small, delicate, generally containing two perfect flowers; and by the leaves and stalks being constantly hairy. It becomes larger when cultivated, and the spikelets have then three florets or more. This grass is found in most pastures, especially high ones, in some meadows, and frequently on banks by road-sides. It is not so early as some of the Poas, but it is not so late as some of the Agrostis genus; it is by no means unproductive, and bids fair to make a good sheep-pasture. This is one of the grasses which Mr. Miller recommends for cultivation, next to the Poas or Meadow-grasses, which he prefers to all others.

AVENA strigosa. *Bristle-pointed Oat.*

Annual. The size of Avena *sativa*. Panicle oblong, directed all one way. Calyxes two-flowered, with a jointed awn at the back, two-awned at the tip, the awn only one third of the length and straight; the inner chaffs have no awns. Among corn: flowering in July.

ARUNDO phragmites, *Common Reed.*

W. 166. S. 144. E. B. t. 401.

Perennial, creeping. Stems annual, the height of a man, but varying from three to twelve feet. Panicle above a foot long, at first very close, but afterwards spreading, and finally nodding. Florets from four to six. Common by the sides of rivers, in ditches, and large standing waters.

Its use in thatching, and for screens in kitchen-gardens, &c. is well known.

ARUNDO epigeios. *Wood Reed.*
Small Reed of Stillingfleet. S. 145. E. B. 403.
A. calamagrostis. H. 54. Calamagrostis lanceolata. W. 122.

Perennial, creeping. Stem nearly as tall, but much stouter than in A. calamagrostis. Leaves linear-lanceolate, twice or thrice as broad as in A. C. Stipula acute. Panicle slightly spreading every way when in bloom. Shady ditches and moist woods; flowering towards the end of July, three weeks later than A. C.

ARUNDO calamagrostis. *Small Reed.*
Branched Reed of St. S. 146. E. B. 2159.
A. epigeios. H. 54. Cal. epigeios. W. 123.

Perennial, slightly creeping. Stems three or four feet high. Leaves linear. Stipula obtuse. Panicle loosely spreading. Moist woods and fenny places; flowering early in July; and not so common as A. epigeios.

Arundo arenaria. *Sea-reed. Marram. Sea-matweed.*
M. 32. S. 148. E. B. t. 520.
Calamagrostis arenaria. W. 123.

Perennial, creeping. Leaves rolled in, hard-pointed. Calyxes one-flowered, longer than the corolla. Panicle shaped like a spike. Flowers upright, without awns. Sandy sea-coasts; flowering in July. It helps very much to consolidate driving sands: The Dutch use it for this purpose; and it is planted about Wells in Norfolk to repel the sea. Mats are made of it; and where it is plentiful houses are thatched with it.

Arundo colorata. See Phalaris arundinacea.

None of the species are of any service in feeding cattle.

Lolium perenne. *Perennial* or *Red Darnel. Ray-grass.*

S. 149. W. 167. E. B. t. 315. M. 4.

Commonly about a foot high. Spike from four to six or seven inches in length, composed of from ten to eighteen spikelets; having from three or four to seven or eight, or even more, florets in each. The spike is awnless; the spikelets are longer than the calyx, and the florets lanceolate. Common by way-sides and in pastures: flowering in June.

The original name is Perennial Darnel. It then acquired the name of Ray-grass from the French; and this has been unluckily corrupted into Rye-grass. In different counties it is called Crap, Eaver, and White Nonesuch. The prejudices against this grass have arisen principally from sowing bad seed, or on an improper soil, or from faulty management *.

LOLIUM temulentum. *Bearded Annual Darnel.*

W. 168. S. 150. E. B. t. 1124.

This grass is taller and larger in every respect than the preceding, and of a paler hue. Its place of growth is also different; for it is a weed among corn. It flowers later, namely in July. The stalk is rugged towards the top; the spike is awned; the spikelets are shorter than the calyx; and the florets are of an elliptic form.

The flour of the seeds is said to produce vomiting, purging, violent cholics, and disorders in the head, resembling inebriation, whence the French name *Ivraie*, and our *Ray*.

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* "This grass, which for many purposes is very valuable, is chiefly to be recommended for the two divisions of soil distinguished under the titles of loam and sand. It will flourish on any land except stiff clay; and will grow even on that; but on rich sands and loams, it becomes not only a good spring-grass, but, if properly managed by due mixtures, turns out well as a permanent pasture-land; always however most valuable by being sheep-fed, for which it is singularly adapted. Mr. Peacey's two varieties of it are said by some, who have tried them, to be superior to the common sort." The Rev. Arthur Young, Essay on the Conversion of Grass-land into Tillage. Communicated to the Board of Agriculture. Vol, III, p. 143.

Lolium arvense. *Beardless annual Darnel*, or *White Darnel.*

W. 168. S. 150. E. B. t. 1125.

Like the preceding; but smaller, and quite smooth. The florets appear to be awnless, but on a more accurate inspection they are often found to have a very short awn below the tip. The spikelets are of the same length with the calyx, or a little longer. In corn-fields, but not so common as the other. Dr. Withering first distinguished this species.

Rotbollia incurvata. *Sea Hard-grass.*

W. 169. S. 151. E. B. t. 760.

Annual. Spike round, awl-shaped. Chaff of the calyx awl-shaped, pressed close, and in two parts. Maritime pastures: flowering in August.

Elymus arenarius. *Upright Sea Lyme-grass.*

S. 152. W. 170. M. 31. E. B. t. 1672.

Perennial. Stalk three or four feet high. Leaves not much shorter, rolled in, mucronate, stiff, sharp-pointed. Spike a span or more in length, as large as a full-sized ear of wheat, but less compact. Dr. Smith remarks, that this may be distinguished from Arundo *arenaria*, which it much resembles, by the smallness of the stipule, which in that is elongated, and two-parted. Frequent on the sea-coast: flowering in July. Dr. Withering conjectures that it may admit of being made into ropes, as Stipa *tenacissima* is in Spain.—E. arenarius of Mr. Hudson's first edition is the maritime variety of Triticum *repens*.

Elymus geniculatus. *Pendulous Sea Lyme-grass.*

S. 153. E. B. t. 1586.

Perennial. Resembling the preceding, and not distinguished from it by Linnæus; but it is higher and more slender: easily known when in flower, by its spike eighteen inches or two feet long, loose, bent in and hanging down; with the calyxes bristle-shaped, spreading, and longer than the spikelet; whereas in the former they are lanceolate, and only about the same length with the spikelet. On the sea-coast; flowering in July.

Elymus europæus. *Wood Lyme-grass.*

S. 154. W. 170. E. B. t. 1317.

Hordeum sylvaticum. H. ed. 2. 57. M. 45.

Triticum sylvaticum. Salisb. prodr. 27.

Secale villosum. H. ed. 1. 46. Stilling.

Perennial. Two feet high. Leaves lanceolate, sharp pointed, flat, spike upright, two inches long. Spikelets two-flowered, or one-flowered, the length of the calyx. All the flowers almost perfect, awned, the awns sometimes twice as long as the floret. In woods, on a calcareous soil: flowering in June. In appearance it is a *Hordeum*; but in structure an *Elymus*. Hudson at first made it a *Secale*, in which he was followed by Stillingfleet.

HORDEUM murinum. *Wall Barley-grass*, *Mouse-barley*, *Way-bennet*, or *Bent*.

W. 171.* C. 5. 9. M. 43. S. 155.

Annual. Stems a foot or more in height. Spike from two to three inches long. The lateral florets male and awned. The intermediate calycine chaffs lanceolate and ciliate. Common by way-sides and under walls: during the greater part of the summer.

HORDEUM pratense. *Meadow Barley-grass*.

S. 156. H. ed. 2. 56. W. 171. E. B. t. 409. M. 108.

Perennial. Stems eighteen inches high. The lateral florets male, with shorter awns. All the calycine chaffs bristle-shaped and rugged.

It is much taller than the preceding, with shorter spikes and awns. The lateral florets are on longer pedicels, and have much shorter awns: they are chiefly male, sometimes abortive. Meadows, chiefly in a strong soil. Mr. Miller recommends it as a good grass; but it is rather late, and is thought not to be so productive as some others. This, and not Lolium *perenne*, is *Rye-grass*.

HORDEUM maritimum. *Sea Barley-grass.*

S. 156. W. 172. M. 44.

H. marinum. H. 57. E. B. t. 1235.

Annual. So like H. *murinum* as not to have been distinguished from it: the leaves however are smoother and more glaucous; the spikelets pyramidal, and more compact; the awns of the calyxes and central flower equal in length; but those of the lateral flowers much shorter. The essential character consists in the widened semi-ovate form of the inner calycine chaffs in the lateral florets, while all the rest are bristle-shaped from the base.

Salt marshes; flowering in June and July. It is this, and not H. *murinum*, which is known in the Isle of Thanet by the name of *Squirrel-tail-grass*, the beards of which stick into the horses' gums, and render them so sore that the animal is in danger of being starved.

TRITICUM repens. *Creeping Wheat-grass*, or *Quick.*

S. 158. W. 173. M. 124. E. B. t. 909.

Perennial, and creeping very much. Stalks two feet high, and twice that height when drawn up in hedges; leaves flat, from five to nine inches long, rugged on the upper surface, and along the edge. Spike nearly upright, two or three inches long, or even more, composed of numerous spikelets, with all the chaffs sharp-pointed, and often more or less bearded: the inner chaffs are ciliate. The number of florets in a spikelet varies from three to eight. The spike is much more slender than in T. *junceum*, and the spikelets only half the size.

Common in arable land, gardens, hedges, and thickets: flowering from June to September *.

Triticum caninum. *Fibrous* or *Bearded Wheat-grass.*

S. 159. W. 176. E. B. t. 1372.

Elymus caninus. Linn.

Perennial, not creeping. Stalks two feet high: leaves flat, rough on both sides, and sometimes hirsute. Spike three or four inches long: lower spikelets often in pairs; the rest alternate. Calyxes sharp-pointed, with short awns, three or five-nerved, four-flowered; chaffs opposite, and not as in Elymus and Hordeum lateral. Awns of the florets twice as long as the chaff, and straight. Woods and hedges, in a calcareous soil: flowering in July. *Smith.*

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* It is a most troublesome weed in arable lands, and can only be destroyed by fallowing in a dry summer. At Naples the roots are collected in large quantities; and sold in the market to feed horses; they have a sweet taste, something approaching to that of liquorice: when dried and ground to meal, they have been made into bread in years of scarcity. The juice of them drank liberally is recommended by Boerhaave in obstructions of the viscera, particularly in cases of schirrous liver and jaundice. Cattle are frequently found to have schirrous livers in the winter, and they soon get cured when turned to grass in the spring. Dogs eat the leaves to excite vomiting. Horses eat them when young, but leave them when fully grown. Mr. Southwell. Cows, sheep, and goats eat them. Mr. Pitt observes, that this is the most common kind of squitch in gardens; but that the squitch so troublesome in arable lands is formed by several species of Agrostis, Holcus *mollis*, and Avena *elatior*. Staffordshire Report.

TRITICUM junceum. *Sea Rushy Wheat grass.*

S. 157. W. 173. Fl. Dan. 916. E. B. t. 814.

Perennial, creeping. The whole plant very glaucous. Leaves rolled in, mucronate and hard-pointed. Spike upright, much broader in proportion to its length than that of any other British Triticum, consisting of numerous alternate flat spikelets, having each five or six florets, perfectly smooth and beardless. Chaffs furrowed and blunt; the inner valve of the corolla flat and fringed. Frequent on the loose sand of the sea-coast, which its long tough creeping roots help to confine. It flowers in July. *Engl. Bot.*

TRITICUM loliaceum. *Dwarf Sea-wheat grass.*

S. 159. E. B. t. 221. W. 174.

Poa loliacea. H. 43. *Stillingfleet.*

Annual. Stalks about four inches high, branched. Leaves flat, but rolling in as they dry. Spike having from eight or nine to twelve or fifteen upright spikelets, all directed to one of the flat sides of the common stalk, so as completely to hide it, while the other side is visible behind. Outer valves of the florets very blunt, with a sharp point; inner lanceolate and acute. In habit and structure nearly allied to Poa rigida, and perhaps of the same natural genus. Sandy sea-coasts; flowering about Midsummer. *Smith.*

SECALE villosum. See ELYMUS europæus.

CYNOSURUS cristatus. *Crested Dog's-tail grass.*

S. 111. W. 150. E. B. t. 316. M. 106.

Perennial. Stems a foot high or more. Spike simple, linear. Spikelets alternate, ovate, two or three flowered, shorter than the bractes, which are toothed like a comb.

Common in dry pastures, sheep downs and parks; flowering in July.

It seems to have been a favourite grass with Mr. Stillingfleet; but it is late and unproductive of foliage. Mr. Stillingfleet noticed one ear at Encomb in Dorsetshire which contained three hundred and seven seeds, though, he adds, the plant was not remarkably large.

CYNOSURUS echinatus. *Rough Dog's-tail grass.*

S. 112. W. 150. E. B. t. 1333.

Annual. Stem branched at the base: leaves rugged on both sides. Spike compound, ovate. Spikelets rugged. Florets have a very long rugged awn on the outer valve. Bractes pinnate scariose, with very long awns, as on the florets. On sandy grounds in Jersey, and the Southern counties of England, but sparingly; flowering in July.

M. Villars says that it is sometimes very tall among corn; and that he has seen it on a rock only two or three inches high.

CYNOSURUS cæruleus. *Blue Dog's-tail grass.*

Linn. H. ed. 2. 59. M. 20. Said to be the earliest grass in blow.

Sesleria cærulea. *Blue Moor-grass.*

S. 94. W. 140.

Perennial. Stalk slender, from two to six or seven inches in height. Leaves bluish sea-green, from half an inch to three inches in length, rough along the edges. Spike reddish purple, or brownish white, short, oblong ovate, blunt, imbricate. Bractes alternate, at the base of the two or three lower spikelets: these are commonly in pairs, and have each two or three florets, but sometimes one only. The chaffs of the calyx have short awns. The outer valve of the corolla is three-toothed, the middle tooth ending in a short awn; the inner valve has two teeth.

Linnæus placed this grass in the genus Cynosurus, on account of the bractes; but these, as Dr. Smith observes, do not belong to the fructification; and it has besides no affinity to Cynosurus. It approaches nearest to Phleum.

Earliness being a very desirable property, this is entitled to respect on that account, for it flowers in April, and sometimes in March. But it is of low growth, and we have no experience of it in culture. It is found on limestone-rocks in the North of England *.

CYNOSURUS paniceus. See PHLEUM crinitum.

HOLCUS lanatus. *Meadow Soft grass.*

S. 89. W. 134. C. 4. 11. E. B. t. 1169.

Perennial, not creeping. Stalks from two to three feet high, upright, pubescent. Leaves greyish, from being covered with soft hairs. Panicle upright, spreading. Chaffs of the calyx equal, pointed, villous, coloured; the inner valve wider; three-nerved. Florets two together, shorter than the calyx; one perfect, the other male only above it, having a bowed awn curved back from the outer valve of the corolla. The velvet softness of the whole plant, and the redness of the opening panicle, render this grass very conspicuous.

It abounds in meadows; is frequent by road-sides, and sometimes grows on walls. It flowers in June and July.

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* Mr. Donn cultivated it for many years on a sterile soil, on a good soil, and under trees; in all it yielded well, and is little affected by soil or situation. It is capable of resisting the severity of the winter, and for earliness of growth and thickness of pasture is unrivalled.

Haller speaks highly of this grass as food for cattle; but it is not esteemed among us. The seed, however, being easily collected, has sometimes been sent to London in great quantities as pure grass-seed, under the name of *White Hay-seeds.*

HOLCUS mollis. *Creeping Soft grass.*

S. 89. H. ed. 2. 440. W. 135. C. 5. 8. E. B. t. 1170.

Perennial, creeping. Usually smaller than the preceding; or, if it be as tall, it has a much more scanty panicle, that has not the brilliant colour which marks the other at its first appearance. The chaffs of the calyx have the keel only ciliate. The florets are hispid at the base. Awn coiled, straight, longer than the calyx, finally jointed and bent in, not curved. According to Mr. Curtis, both flowers are perfect, and produce seed. —Woods, hedges, and corn-fields; flowering in July and August.

LAGURUS ovatus. *Hare's tail grass.*

E. B. t. 1334.

Is found only in Guernsey.

INTRODUCTION

TO THE

CALENDARS OF FLORA.

INTRODUCTION

TO THE

CALENDARS OF FLORA.

ON THE

FOLIATION OF TREES.

By HARALD BARCK.

Upsal, 1753, *May* 3.

Translated from the original in the Amœnit. Acad. vol. III.

BOTANISTS in every age have not only taken great pains to discover and give names to plants, but have also described them with all possible accuracy. But this part of knowledge has been, till this present age, confined to narrower bounds than it deserved; for an opinion has prevailed amongst almost all the men of learning, that it is of no use out of the regions of medicine. From whence it has happened, that we find very few who have cultivated botany, except physicians; nor have even these carried their enquiries farther than to obtain a moderate knowledge of officinal plants. But in our times some, who are worthy of the highest regard from all true lovers of this study, have endeavoured to find out and investigate the virtues of plants with greater care and industry. For these men, besides medical uses, have discovered great and remarkable advantages accruing from such researches. However, I do not intend to give a catalogue of them here; but shall content myself with just touching upon some few things that have been done in our own university. In the *Philosophia Botanica* our illustrious President has shewn, that every soil has its own peculiar plants, which we may seek for in vain any where else; and that certain plants keep, as it were, their watches, *i. e.* expand their flowers and close them again at stated times *. The dissertation on the *espousals of plants* has imparted to the learned world the nature of various phænomena, which occur in the fœcundation of plants. The *Flora œconomica* has faithfully set forth the use of plants in private life. The dissertation on the *buds of plants* has opened to us the cause why various trees cannot bear the snows and frosts of our part of the world. From the essay on the *esculent plants* of our country, we find that there are many plants growing with us which are proper for food, hitherto overlooked. In the *Swedish Pan* it is shewn, that certain plants only are destined for sustenance to certain animals. From the *Hospita Insectorum Flora* we are informed that certain vegetables are eaten by certain species of insects. It is now the fourth year since our illustrious President exhorted his countrymen to observe with all care and diligence, at what time every tree expands its buds, and unfolds its leaves;

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* Vid. Philos. Botan. p. 263, 273. Warck. This curious subject is amply treated in Amœn. Acad. vol. IV.

imagining, and not without good reason, that our country would some time or other, from observations of this kind made in different places, reap some new and perhaps unexpected advantage. Upon this admonition, I at that time living in Smoland with G. A. Witting, major, and knight of the military order, was incited to observe for the space of three years, beginning from 1750, the days when different trees began to put out their leaves, when the countrymen sowed their fields, and how much time there passed between seed-time and harvest. This I did with intent, if possible, to find out fixed laws by which to regulate the proper seed-time in every province. But as the few observations which I was able to make, were not sufficient for this purpose; that the work therefore which I meditated might not rest upon too slight a foundation, our President communicated all the papers sent to him from different places for my examination. Such then is the design of this essay; and I submit it to the candid reader, hoping that he will look upon it with an indulgent eye.

Our lands, which lie under a cold sky, are bound up with frost all the winter. Hence the roots of our plants, oppressed as it were with a drowsy sleep, are benumbed, and many herbs that remain above ground die *. But

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* We have had five winters remarkably severe in Sweden, viz. 1665, 1683-4, 1708-9, 1739-40, and 1751. The cold of which last Feb. 1, N. S. was extremely intense, and such as has scarcely been

when the sun by its mild rays at the beginning of spring refreshes the earth, the snows melt, the ice gives way, the frost is dissolved, and a joyful face of things returns. Immediately we see the vernal flowers begin to celebrate their nuptials, and the trees, one after another, open

known in this age, for the botanic thermometer sunk to 32 degrees. Barck. In that thermometer the freezing point is 0, and that of boiling water 100. So that taking it for granted that, the author must mean 32 below 0, this point would answer to 57 below 32, or the freezing point of Farenheit, which is a degree of cold never known in this country. I am assured from good authority, that in the year 1739 the thermometer did not sink nine degrees below freezing point in England. They who are curious to see much more surprising instances of cold than that in Sweden, may consult the preface to Gmelin's Flora Sibirica, where they will find how very apt philosophers are to fall into mistakes about the power of Nature, when they trust to theory instead of consulting experience. Mons. Maupertuis says, that the mercury in Reaumur's thermometer in Lapland sunk to 37 degrees below freezing point, which is equal to 67 degrees in Farenheit.

Perhaps, says Linnæus, in the Flora Lapponica, the curious reader will wonder how the people in Lapland, during the terrible cold that reigns there in winter, can preserve their lives; since almost all birds, and even some wild beasts, desert it at that time. The Laplander, not only in the day, but through whole winter nights, is obliged to wander about in the woods with his herds of rhen deer. For the rhen deer never come under cover, nor eat any kind of fodder, but a particular kind of *liverwort*. On this account the herdsmen are under a necessity of living continually in the woods, in order to take care of their cattle, lest they should be devoured by wild beasts. The Laplander easily does without more light, as the snow reflects the rays that come from the stars, and as the *aurora borealis* illuminates the air every night with a great variety of figures. The cold is so great that foreigners are kept their buds, and clothe themselves with leaves. It is a matter of wonder why the *wood plants*, as the *spurge laurel*, the *wood anemone*, the *noble liverwort*, the *vernal vetch*, the *broom rape*, the *pasque flower*, the *colts-foot*, the *sage of Jerusalem*, *pilewort*, *violets*, &c. and the garden plants, as the *asarabacca*, *snow drops*, *bulbous violet*, *vernal crocus*, and others, should flower in the

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aloof, and even deterred from their most happy woods. No part of our body is more easily destroyed by cold than the extremities of the limbs, which are most remote from the sun of this microcosm, the heart. The kibes that happen to our hands and feet, so common in the northern parts of Sweden, prove this. In Lapland you will never see such a thing, although were we to judge by the situation of the country we should imagine just the contrary, especially as the people wear no stockings, as we do, not only single but double, and treble. The Laplander guards himself against the cold in the following manner. He wears breeches made of rhen deer skins with the hair on, reaching down to his heels; and shoes made of the same materials, the hairy part turned outwards. He puts into his shoes *slender-eared broad-leaved cyperus grass*, carex vesicaria, Spec. Pl. that is cut in summer and dried. This he first combs, and rubs in his hands, and then places it in such a manner that it not only covers his feet quite round, but his legs also, and being thus guarded, he is quite secured against the intense cold. With this grass they stuff their gloves likewise, in order to preserve their hands. As this grass keeps off the cold in winter, so in summer it hinders the feet from sweating, and at the same time preserves their feet from being annoyed by striking against stones, &c. for their shoes are very thin, being made, not of tanned leather, but the raw hide. It was difficult for me to find what particular kind of grass they prefer for this purpose, as not being every where the same, though always one of the *cyperus grasses*; but I perceived at last that it was what I mentioned above. Thus far Linnæus. I will add, that this grass grows with us.

very beginning of spring; when we cannot by any pains or care bring them to flower in the autumn, or after the summer solstice. For it is remarkable, that these plants, which are so very patient of the cold in the spring, are yet in the autumn so-tender and weak, that they die like the Indian plants upon the first hoar frost*, for instance, the *blue mountain thistle*, *touch-me-not*, &c. On the contrary we see *succories* and *thistles* never flower before the same solstice, whence the husbandman judges from their flowers, as from a calendar that cannot deceive, that the solstice is past. From hence it is evident, that there is something else besides moisture and heat which promotes the fertility of plants.

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* The iron nights, as they are called in the Swedish language, *i. e.* sharp nights, happen generally at Upsal between the 19th and 31st of August, *e. g.* 1746 they began the 19th, 1748 the 17th, 1749 the 1st of September, 1750 the 20th of August, 1751 the 27th, 1752 the 20th. They seldom last above three or four nights. After these barley does not grow, and about the time they come on, the gardeners do not venture to trust their green-house and other tender plants any longer to the open air. At that time the leaves of the *fig*, the *mulberry*, the *walnut*, the *vine*, the *toxicodendrum*, and even of the *beech* are shrivelled up. The Indian plants, such as the *kidney bean*, the *African marygold*, the *cucumber*, the *amaranth*, the *convolvulus*, the *tobacco*, the *thorn apple*, &c. die. Nay, sometimes even our native plants, as the *noli me tangere*, the *lesser burdock*, the *bryony*, the *viper's bugloss*, the *pimpernel*, the *blue mountain sow-thistle*, the *goosewort*, &c. wither. But before this happens, the *meadow saffron* puts forth its flowers, and that sometimes sooner, sometimes later, according as these iron nights come sooner or later. Barck.

In the same manner trees observe fixed laws, and a certain order in their leafing; so that he who is but moderately versed in this affair may immediately know, when he sees one species of trees in leaf, what species will be next in leaf. Nor do we hardly ever find this order of Flora transgressed. He who should imagine that he had found the true cause of this phænomenon in the different depths of the roots of different trees would be mistaken; for then shrubs would always be in leaf before trees of one and the same kind, which yet rarely happens. This phænomenon therefore arises without doubt from some other cause, hitherto undiscovered, and perhaps explicable only by the different texture of the tree.

The order of the leafing of trees and shrubs with us is as follows:

1 *Red elder* *
2 *Honey suckle*
3 *Gooseberry*
4 *Red currant*
5 *Spiræa frutex*
6 *Bird cherry*
7 *Spindle tree*
8 *Shrub cinquefoil*
9 *Common elder*
10 *Privet*
11 *Quicken tree*
12 The *osier*
13 *Alder*
14 *Sea buckthorn*
15 *Apple tree*
16 *Cherry tree*
17 *Water elder*
18 *Birch*
19 *Hasel*
20 *Elm*
21 *Dog rose*
22 *Pear tree*
23 *Plum tree*
24 *Buckthorn*

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* Sambucus racemosa.

25 *Berry-bearing alder*
26 *Lime tree*
27 *Beech*
28 *Aria Theophrasti*
29 *Asp*
30 *Maple*
31 The *oak*
32 The *ash* *

With the first soft breeze, says Pliny, the *cornelian cherry* puts forth its buds, next the *bay* a little before the æquinox. The *lime*, the *maple*, the *poplar*, the *elm*, the *sallow*, the *alder*, the *filberd*, and *hasel*, are among the first that put out leaves; the *plane tree* also is very early. Nat. Hist. lib. 16. 25.

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* As I do not know that any thing of this kind has ever been published in England, I will subjoin the order of the leafing of some trees and shrubs, as observed by me in Norfolk, 1755.

1	Honey suckle	Jan. 15	19	Marsh elder	April 11
2	Gooseberry	March 11	20	Wych elm	12
3	Currant	11	21	Quicken tree	13
4	Elder	11	22	Hornbeam	13
5	Birch	April 1	23	Apple tree	14
6	Weeping willow	1	24	Abele	16
7	Rasberry	3	25	Chesnut	16
8	Bramble	3	26	Willow	17
9	Briar	4	27	Oak	18
10	Plumb	6	28	Lime	18
11	Apricot	6	29	Maple	19
12	Peach	6	30	Walnut	21
13	Filberd	7	31	Plane	21
14	Sallow	7	32	Black poplar	21
15	Alder	7	33	Beech	21
16	Sycamore	9	34	Acacia robinia	21
17	Elm	10	35	Ash	22
18	Quince	10	36	Carolina poplar	22

The foliation or leafing of the first four shrubs, 1, 2, 3, 4, varies very much as to the time, and the day on which they break bud; for as the winter goes off sooner or later, so they are in leaf sooner or later. But this does not hold of the rest; for example, in 1750, in which there was scarcely any winter-weather, but the whole was almost a perpetual spring, I observed towards the latter end of March, that the *currant* and *gooseberry* were in blow about Gripenberg; whereas the last year they did not blow till the middle of April. The *oak*, and the *ash*, seldom shew theirs before the night frosts are over *. For which reason gardeners do not venture to trust their house-plants to the open air till the leaves of the last trees give sign of a mild winter.

The prudent husbandman will above all things watch with the greatest care the proper time for sowing; because this with the Divine assistance produces plenty of provisions, and lays the foundation of the public welfare and private happiness. The ignorant farmer, being more tenacious of the ways and customs of his ancestors, fixes his sowing season generally to a month and to a day; whether or no the earth be prepared to receive the seed he little cares. From whence it frequently happens, that the fields do not return what might be expected, and that what the sower sowed with sweat, the reaper reaps with sorrow. Wise œconomists therefore in all ages have endeavoured to fix a certain time for sowing; but hitherto their labour has proved fruitless. There have been some who have tried to discover the qualities of the land necessary for this purpose, by taste and smell; nor have there been wanting others who were persuaded, that the smell of the earth gave infallible signs of seed-time. All which, although perhaps not wholly without foundation, are yet insufficient for obtaining our end; for the experience of many years has taught us, that the seeds of one and the same species sown in the same ground at different times do not produce equal crops. We have seen even a great difference between what was sown in the morning and the afternoon. Thus also while one plant is vigorous and flourishes, another of the same nature, and raised in the same soil, withers and dies. The farmer often throws the cause of scarcity upon Providence, who punishes an ungrateful people by ordering the fields to mourn in weeds, and the corn to mock the threshers' toil with empty husks; but it may be with truth asserted, that this surmise is often without foundation. He ought rather to complain of his own imprudence, and accuse himself that his granary is not better stored.

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* This agrees with Lord Bacon's observations, Nat. Hist. p. 146. that a long winter makes the earlier and later flowers come together, which I observed was the case in 1755, when the spring was very backward. The author says in a note, it has been observed for above ten years past, that the oak has been always in leaf before the end of May, in Upland.

We look up to the stars *, and without reason suppose, that the changes on earth will answer to the

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* The observation of the stars for this purpose was transmitted down to us by the Greeks and Romans from Ægypt, where the seasons being much more regular than in these northern parts, might be as sure a guide in that country as any they could follow. But an astronomical calendar perhaps may not be so good a guide to us as the vegetation of certain plants; supposing we could once fix on the proper one for sowing each kind of seed. I have been told by a common husbandman in Norfolk, that when the oak catkins begin to shed their farina, it is a proper time to sow barley; and why might not some other tree serve to direct the farmer as to other seeds? The prudent gardener never ventures to put his house-plants out till the mulberry leaf is of a certain growth.

It appears from Geminus in his elements of astronomy, that the coincidence of the seasons, as to heat, cold, rain, &c. with the risings and settings of the stars, had caused a notion to prevail among the antients, that these celestial phænomena were not merely the signs, but the causes of the different seasons. This notion, which he takes some pains to overturn, would never have begun in such uncertain climates as are found in these parts of the world. But in Ægypt, where the Nile begins to rise regularly upon the appearance of Sirius, or the dog-star, where the Etesian winds begin, and cease to blow constantly about the same time of the year, and when in general the variation of the weather is nearly uniform, such a notion might easily prevail in the minds of an unenlightened and superstitious people. From them it was propagated into Greece, where, though it must have been frequently thwarted by a much less constant uniformity, yet it might still be upheld by that blind veneration which generally attends antiquity, especially amongst the ignorant and unlearned. As for the Romans they went still farther; for, without even adapting an almanack to their own climate and time, they fixed the seasons for husbandry work of all kinds by the risings and settings of the stars, such as they found them in the heavenly bodies; entirely neglecting the things that grow round about us. We see trees open their buds,

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Greek calendars. To this custom Geminus certainly alludes when he observes, that an almanack, which may pretty well foretel the weather in one country is good for nothing in another, as one would think should be obvious at first sight. Yet this he thought necessary to explain and dilate upon, in order to convince the Romans of their error; for though, as Petavius observes, the later astronomers went more accurately to work, the prejudice still remained in the minds of the country people, and the vulgar. Whether Geminus thought those predictions concerning heat, cold, rain, drought, &c. which are found in the Alexandrian, Greek, and Roman calendars, just as in some of our modern ones, were universally precarious, or whether he only thought they were so in such climates as that of Rome, where he is supposed to have lived, he commends Aratus for making use of the natural signs, taken from the aspects of the sun, and some of the stars, as also of the signs taken from brutes, instead of the rising and setting of the stars, and gives this reason of his preference, that those predictions which have some natural cause, have a necessary effect; adding, by way of confirmation of his opinion, that Aristotle, Eudoxus, and many other astronomers, made use of them. These predictions are copied by Virgil, but I do not recollect any place in his Georgics, where the seasons for ploughing, sowing, &c. are fixed, by the appearance of birds of passage, or of insects, or by the flowering of plants, which method was begun by Hesiod, but never afterwards attended to, that I know, till Linnæus wrote. Hesiod says, if it should happen to rain three days together when the *cuckow* sings, then late sowing will be as good as early sowing. When *snails* begin to creep out of their holes, and climb up the plants, you must leave off digging about vines, and take to pruning. When the *artichoak* begins to blow, and the *grasshopper* chirps upon trees, which, as Theophrastus observes, was about the summer solstice, then goats are in full season, &c. When the *fig-leaf* is about as big as a crow's foot, the time for sailing comes on. When the voice of the *crane* and expand their leaves; from hence we conclude that spring approaches, and experience supports us in this conclusion; but nobody hitherto has been able to shew what kind of tree Providence intended should be our calendar, that we might know on what day the countryman ought to sow his grain. The sun acts on the earth

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is heard overhead, then is the time for ploughing. It is true the poet frequently marks the seasons, by the risings and settings of the stars; and as astronomy, besides its many important uses, is connected with finer sciences, has something in it very striking to the imagination, and has been cultivated by men who had leisure to make calendars for general use, it was natural that it should get the ascendant over rules surer perhaps in themselves, and more adapted to the purpose of the husbandman, but which were destitute of the advantages abovementioned, and were most probably looked on only as poetical embellishments.

It is wonderful to observe the conformity between vegetation and the arrival of certain birds of passage.

I will give one instance as marked down in a diary kept by me in Norfolk in the year 1755. April the 16th *young figs* appear; the 17th of the same month the *cuckow* sings. Now the word κοκκυξ signifies a *cuckow*, and likewise the *young fig*, and the reason given for it is that in Greece they appeared together. I will just add, that the same year I first found the *cuckow flower* in blow the 19th of April.

To the instance of coincidence of the appearance of the *cuckow*, and the fruit of the *fig-tree* in Greece and England, I will here add some coincidences of the like nature, in Sweden and England.

Linnæus says, that the *wood-anemone* blows from the arrival of the *swallow*. In my diary for the year 1755, I find the *swallow* appeared April the 6th, and the *wood-anemone* was in blow the 10th of the same month. He says, that the *marsh-marygold* blows when the *cuckow* sings. According to my diary the *marsh-marygold* was in blow April the 7th, and the same day the *cuckow* sung.

by loosening, warming, and preparing it, as the culinary fire does our meat, for which a certain degree of heat is requisite. For the sun by its heat drives the juices taken in by the roots through the vessels of the tree, which do not return by circulation, but become more copious by the daily addition of fresh heat. It. Scan. 23.

Nature always takes the easiest and shortest way in all her works. He therefore who would imitate her must do the same. No one, I think, can deny but that the same force, which brings forth the leaves of trees, will also make the grain vegetate; and no one can justly assert that a premature sowing will always, and every where, accelerate a ripe harvest. Perhaps therefore we cannot promise ourselves a happy success by any means so likely as by taking our rule for sowing from the leafing of trees. We must for this end observe in what order every tree according to its species, heat of the atmosphere, and quality of the soil, puts forth its leaves. Afterwards comparing together the observations of many years, it will not be difficult from the leafing of trees to define the time, if not certainly, yet probably, when not only *barley*, but *vernal rye*, *oats*, and other annual plants ought to be sown.

To attain this end many, at the exhortation of our President, noted, not only the time of the foliation of trees, but the day also on which *barley* was sown, and cut; and were so kind as to communicate to me their observations *. I acknowledge myself much obliged to each of these worthy gentlemen for the benevolence shewn me on this occasion, and more particularly to D. Torên, who for the space of three years made his observations on a tree of the same species with care and diligence; as also to D. Eric Ekelund, who did the same with the like industry for two years. Some perhaps had not always time, or opportunity, to make their experiments with the same attention; for those, who are detained in cities, often want a number of trees to observe these things as they ought, and those who live in the country are often drawn by domestic affairs from things of this nature. But if observations were made according to the following rules: 1st, That they should be continued for *three years*, and those specified, as well as the *places* in every observation. 2d, That they should be made on the same *individuals*. And 3d, on trees which grow on the *same soil*, and in the *same exposition*, as the *field* that is to be sown. Were these circumstances, I say, attended to, perhaps we might be able to form more certain rules for the use of the farmer; but since these rules have been sometimes neglected, our business will not succeed so well; for who does not know that the *north wind*, *shade*, and a

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* The author gives, in a note, a list of eighteen persons who had communicated their observations made in Sweden, Norway, Finland, and Lapland, some for one, some for two, others for three years, from 1750 to 1752, both inclusive.

moist soil, hinder the leafing of trees as much as a *dry situation* on the slope of a hill inclining to the south promotes it? Besides many errors have crept into these observations; for instance, some trees between whose leafing there ought not to intervene above two or three days, are often disjoined from one another by the interval of a fortnight; not to mention the order of leafing, which trees scarcely, or rather never, transgress, being tied down to it by Nature herself, but which often does not appear in these journals *.

If we consider the year 1750, we may remember that the winter was milder than ordinary, and the spring very early. Whence some in Upland sowed their lands about the end of February; which they scarcely ever do in other years before April. I am not ignorant, that the lands in some of the northern provinces, especially those which abound in clay, require early sowing, that the ground may be broken with less trouble, and that the first shoots of the barley may make their way through it before it grows stiff. But the people of Schonen, and others, that dwell near the sea, sow late, whether the spring be early or not; and that sometimes to their great loss, for no other reason but that they received this custom from their ancestors. The most northern inhabitants of Sweden find it necessary to sow as soon as the frost breaks up; that the short summer may perfectly ripen the grain before the winter approaches. For as eggs require a fixed time for the exclusion of the young, so the barley does in different provinces to ripen the seed. To prove this I will produce some examples.

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* In the original there follows a section which I have not translated. The intent of it is to explain a table giving an account of the different days of the foliation of some trees and shrubs in Sweden, Norway, &c. which I have omitted, as thinking it would afford little or no entertainment to the reader.

		Sowing.	Harvest.	Days.
Pithoa.	1740	June 4	Sept. 1	89
	1741	May 29	Aug. 31	94
	1742	27	29	94
	1743	27	26	91
	1744	31	26	87
	1745	24	27	95
	1746	26	25	91
	1747	28	23	87
	1748	June 4	22	79
	1749	May 21	22	93
	1750	19	14	87
	1751	21	11	92
			Medium	85
Upsal.	1747	April 28	Aug. 17	111
	1748	29	20	113
	1749	May 6	27	113
	1750	April 16	30	155
	1751	28	24	118
	1752	30	31	92
			Medium	105

	Sowing.	Harvest.	Days.
Nafinge 1750	April 20	Aug. 12	113
toward	May 4	7	95
Norway.	19	12	85
	21	14	85
	26	15	81
	June 13	25	73
		Medium	93

Korn an	1731	May 28	Aug. 31	95
island of	1732	June 18	Sept. 14	88
Bahus.	1734	May 9	Aug. 13	101
	1735	25	15	82
	1786	29	27	90
	1738	June 3	Sept. 5	94
	1739	May 8	3	118
			Medium	100

From these observations, which I have produced, and many others, I can conclude nothing at present, unless that the *sowing of barley* nearly coincides with the *foliation of the birch*, at least in Upland, and other places adjacent; and if this sign is not to be depended upon every where, yet it would be easy for us, on a due examination, to find out some other tree, more suited to this purpose; and which some provinces might use as a calendar, while the greater part might consult the *birch*. It is a popular error, that less time passes between the sowing and ripening of wheat in our northern provinces than here at Upsal, and that this happens because the summer days are longer in the north, and there is scarcely any night to retard its growth. But this error is made evident by the grain ripening in as short a time in Schonen as in Lapland. For barley in the champain part of Schonen is sown about May the 29th, and reaped sooner than in Upland. But why *barley* ripens later in Upland and Westmanland than in the other provinces of Sweden is to me absolutely a secret.

If a number of future observations shall confirm the doctrine which I have been delivering, I do not doubt but that we may reap many advantages from it. For then we should not want a sure guide for the husbandman to regulate himself in sowing his grain, and for the gardener to sow his kitchen and other seeds. What great benefit therefore would arise to the publick if one in every province would yearly make observations in this way, and at last communicate them in the same manner as astronomers do their meteorological ones to the Royal Society, or Academy of Sciences?

It will besides be necessary to remark what sowing, made on different days in the spring, produces the best crop; that, comparing these with the foliation of different trees, it might appear which is the most proper time for this purpose. In like manner it will not be amiss to note, at what time certain plants, especially the most remarkable in every province, blow; that it might appear whether the year made a slower or a quicker progress. For we see, although observations of this kind have not yet come into use, that the mower can guess at the time proper for cutting grass, either from the flowers of the *parnassia*, the *devil's bit*, the *marsh gentian*, or the *bastard asphodel*, bursting forth; or from the flowers of the *purple meadow trefoil* withering, or from the ripening of the seeds of the *yellow rattle*; or in higher places from the yellow hue of the leaves of the *leopard's bane*. Would botanists, like astronomers, note the time of foliation, and flowering of trees and herbs, and the days on which the seed is sown, flowers and ripens; and continue these observations for many years, there can be no doubt but that we might find some rule from which we might conclude at what time grains, and culinary plants, according to the nature of each soil, ought to be sown; nor should we be at a loss to guess at the approach of winter; nor be ignorant whether we ought to make our autumn sowing later or earlier. Lastly, the gardener would have a more sure prophet to consult; whereas now he guides himself by nothing but fallacious conjectures.

This is all which I think fit to produce upon this copious subject, and I hope the candid reader will not be surprised that I am so short upon it, as it has not yet been handled; and is far from being hitherto perfectly understood. It is much above my power to go to the bottom of this affair, but by touching upon it in a summary way I mean to excite men of greater ability, who may treat it in the manner it deserves.

THE CALENDAR
OF
FLORA.

1. SWEDISH.

AND

2. ENGLISH; MADE IN 1755.

3. GREEK; SELECTED FROM THEOPHRASTUS.

Φραζεσθαι δ' ευτ' αν φωνην γερανου επακουσῃς, &c..
Ημος κοκκυξ κοκκυζει δρυος εν πεταλοισι—
Ημος δε σκολυμος τ' ανθει, καὶ ηχετα τεττιξ,
Δενδρεω εφεζομενος λιγυρην επιχευετ' αοιδην
Ημος δη το πρωτον οσον τ' αποβασα κορωνη
Ιχνος εποιησεν.——

These verses, quoted from Hesiod, are taken from different parts of the second book of his Εργοι καὶ Ἡμεραι. v. 66. 104. 200. 297. in which the Greek poet notes the proper seasons of sowing, reaping, &c. from the appearance of birds, flowering of plants, &c. The meaning in general is, Observe when cranes first make their appearance, when the cuckoo sings, when thistles bloom, when the cicada twitters, and when the raven stalks; these are prognostics of Spring and Summer.

TO THE RIGHT HONOURABLE THE

LORD VISCOUNT BARRINGTON,

SECRETARY AT WAR.

MY LORD,

I EMBRACE with great pleasure the liberty you allow me of dedicating the following pieces to your Lordship. For though I must not presume to speak all I feel on this occasion; yet I hope I may, without offence, take notice of that most amiable and benevolent disposition which makes you delight in assisting those who are incapable of making any return. This is the least that can be said by one who is himself of that number, and who is desirous to express in a public manner his sincere gratitude and respect. I am,

My Lord,

Your Lordship's much obliged,

and very humble Servant,

BENJ. STILLINGFLEET.

PREFACE.

IN my notes on the Foliation of Trees I marked the day of the month on which certain trees leafed in 1755; and likewise mentioned some coincidences of the coming of birds, and the flowering of plants in this and other countries. The instances I there gave were but few, as I could then find no more parallel observations made in other countries to compare mine with. Since that time another volume of the Amœnitates Academicæ is come out, in which is a small treatise, intituled, the Calendar of Flora. This treatise contains an account of the leafing and flowering of many plants, as also of the departure and return of birds. As these observations happen to be made the very same year in which mine were, and as they are the first of the kind perhaps that ever were made, I was induced to look over my papers again, which I had thrown by as of no consequence; thinking that in these circumstances some use ought to be made of them, as they might prove entertaining at least, if not instructive, to those whose genius leads them to curiosities of this kind. I am very sensible of the small number of such persons, but I am contented to write for those few; nay indeed, I write because there are so few, being willing, as far as lies in my power, to increase their number, But it may be asked, perhaps, by some, even after they have considered all that is said on this subject in the introduction to the Swedish Calendar, and in the piece on the Foliation of Trees, why endeavour to increase their number? Are there not idle people enough already? What signifies whether such a plant be in blow or in leaf at the same time with some others; or when such a bird comes or goes, sings or is silent? If we hear the bird sing, and know for what purposes the plant is useful, we know all that is necessary; every thing beyond that is but the wish, or rather dream of enthusiasm, which wants to give an air of importance to its favourite subject. This perhaps may be said by some; but the same way of reasoning applied to other things will shew, that it may possibly be wrong. For instance, the sea swells twice in twenty-four hours, and the moon passes through the meridian circle as often in the same time. Now should it be said, that if we know each of these truths separately it is enough; and that to know farther what relation, in point of time, one of these phænomena has to the other, is nothing to the purpose; I believe such an assertion would at this time appear absurd, however it might have passed in ignorant ages. I think we may assert universally, that whenever two things, however disparate in their nature, constantly accompany one another, they are both actuated and influenced by the same cause. Now that cause may probably operate on other things that lie within the reach of our powers, and depend on our determination. Thus that constitution of the air, which causes the cuckow to appear about the time when the fig-tree puts forth its fruit, may indicate the properest season to sow some of our most useful seeds, or do some other work which it imports us to do at a right time; and that time may not be according to certain calendar days, but according to a hitherto unobserved calendar, which varies several weeks in different years. I do not absolutely assert, that we can come to make use of such a calendar, but I desire that others will not assert the contrary at present, and leave this affair to be decided by the only proper way, which certainly must be experience.

We know, from Hesiod, that husbandry was in part regulated by the blowing of plants, and the appearance and departure of birds; and most probably it had been in use long before his time, as astronomy was then in its infancy *; but, when artificial calendars came into vogue, the natural calendar seems to have been totally neglected, for I find no traces of it after his time, whether for good and sufficient reasons I pretend not to determine. That it was laid aside before the time of Aristophanes we have a positive proof in his *Aves*, where he makes Pisthetairus say, "Formerly the kite governed the Grecians," which, according to the explication of the scholiast, means, that formerly the appearance of the kite was looked on as a sign of Spring. He says afterwards, that "the cuckow formerly governed all Ægypt and Phœnicia, because when that bird appeared they judged it was time for wheat and barley harvest."

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* Hesiod himself was one of the earliest of the Greek astronomers. He lived, according to Sir Isaac Newton, about seventy years after Chiron, who formed the constellations for the use of the Argonauts; and from Hesiod the gross and coarse method of astronomy was called the Hesiodean method.

I shall make no farther mention at present of the use of plants in directing the husbandman, but take this opportunity of making a digression about birds in relation to their prognostic nature. From the time of Hesiod they seem to have been considered as no longer capable of directing the husbandman in his rural affairs; but they did not however lose their influence and dignity; on the contrary, they seem to have gained daily a more than ordinary, and even wonderful authority; till at last no affair of consequence, either of private or public concern, was undertaken without consulting them. They were looked upon as the interpreters of the gods, and those who were qualified to understand their oracles were held among the chief men in the Greek and Roman states, and became the assessors of kings, and even of Jupiter himself *.

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* Jovi optimo maximo se consiliarum atque administrum datum meminerit augur. Cicero.

Lacedæmonii reges augurem assessorem habuerunt. Id.

Aves internunciæ Jovis. Id.

Sacerdotum collegium vel nomine solenne. Plin. Nat. Hist. speaking of the augurs.

However absurd such an institution as a college of augurs may appear in our eyes, yet, like all other extravagant institutions, it had in part its origin from nature. When men considered the wonderful migration of birds, how they disappeared at once, and appeared again at stated times, and could give no guess where they went, it was almost natural to suppose, that they retired somewhere out of the sphere of this earth, and perhaps approached the ætherial regions, where they might converse with the gods, and thence be enabled to predict events. This I say was almost natural for a superstitious people to imagine, at least to believe, as soon as some impostor was impudent enough to assert it. Add to this, that the disposition in some birds to imitate the human voice must contribute much to the confirmation of such a doctrine. This institution of augury seems to have been much more antient than that of aruspicy; for we find many instances of the former in Homer, but not a single one of the latter, though frequent mention is made of sacrifices in that author. From the whole of what I have observed, I should be apt to think that natural augury gave rise to religious augury, and this to aruspicy; as the mind of man makes a very easy transition from a little truth to a great deal of error.

A passage in Aristophanes gave me the hint for what I have been saying. In the comedy of the *Birds* he makes one of them say thus: "The greatest blessings which can happen to you mortals are derived from us;

first we shew you the seasons; *viz.* Spring, Winter, Autumn. The *crane* points out the time for sowing, when she flies with her warning notes into Ægypt; she bids the sailor hang up his rudder, and take his rest, and every prudent man provide himself with winter garments. Next the *kite* appearing proclaims another season, when it is time to shear your sheep. After that the *swallow* informs you when it is time to put on summer-clothes*. We are to you, adds the chorus, Ammon, Dodona, Apollo; for after consulting us you undertake every thing; merchandize, purchases, marriages, &c."

Now it seems not improbable that the same transition was made in the speculations of men, which appears in the poet's words, and that they were easily induced to think, that the surprising foresight of birds, as to the time of migration, indicated something of a divine nature in them: which opinion Virgil, as an Epicurean, thinks fit to enter his protest against; when he says,

> *Haud equidem credo quia sit divinitus illis*
> *Ingenium.*

But to return to Aristophanes. The first part of the chorus from whence the afore-cited passage is taken, seems, with all its wildness, to contain the fabulous cant of the augurs to account for their impudent impositions on mankind. It sets out with a cosmogony, and says, that in the beginning were Chaos, and Night, and Erebus, and Tartarus. That there was neither water, nor air, nor sky; that Night laid an egg, from whence, after a time, Love arose. That Love, in conjunction with Erebus, produced the bird kind, and that they were the first of the immortal race.

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* Πρωτα μεν ὡρας φαινομεν ἡμεις ηρος, χειμενος, οπωρας.
Σπειρειν μεν οταν γερανος κρωζουσ᾽ ες την Λιβυην μεταχωρη, &c. &c.

With this passage in Aristophanes the account of the oracle of Dodona seems to agree. This oracle was the oldest in Greece, and there a *dove* prophesied, according to the concurrent testimony of history; but, according to the explication of Herodotus, this strange opinion arose from hence, that the Theban priestess, who was stolen by the Phœnicians, and carried into Greece, was called a *dove*, because, being a barbarian, she seemed to the Dodoneans to chatter like a bird, till she had learned the Greek language, and then she was said to speak with a human voice. This explication seems to me extremely forced, and every thing is much better accounted for by supposing, that at Dodona natural augury was first changed into religious augury; for there the oaks also prophesied, which plainly shews the first state of religious augury, when it had not wholly put off its antient form, but, like the monsters in Ovid's Metamorphoses, still retained enough to convince us what it had once been. That Dodona was one of the first places where augury was practised, is highly probable; for it is mentioned by Homer as an oracle of established reputation at the time of the Trojan war. Now Pliny tells us, that Tiresias invented augury and aruspicy;

and that he was reputed an augur appears by Sophocles in the Œdipus Tyrannus, where he is introduced saying thus to Tiresias: "If you have received any information concerning the death of Laius from the birds, or by other means, do not envy it us." Tiresias therefore, according to Sophocles, lived in the time of Laius; and Laius, according to Sir Isaac Newton, lived not eighty years before the taking of Troy,

I will here subjoin an account of what has been observed about the disappearance of birds, which will serve to confirm what I said above concerning the effect which that phænomenon might not improbably have made on the minds of men; and give room for superstitious impostures. Aristotle has a chapter on that subject; wherein he says, "that many birds, and not a few, as some imagine, hide themselves in holes:" he then enumerates the *swallow*, the *kite*, the *thrush*, the *starling*, the *owl*, the *crane*, the *turtle*, the *blackbird*, and the *lark*, as certainly hiding themselves; which shews how little was known of their real state in his days; nay, so much was he puzzled about this subject, that in another place he supposes some of the birds to be changed in their form and voice at different seasons. Thus he says, that the *redstart* changes into the *robin redbreast;* and Gesner gives this reason for Aristotle's falling into this opinion, that during the summer the *robin redbreast* lives in desert places, and comes towards towns and houses in the autumn, when the *redstart* disappears. Again Aristotle says, that the *black cap* changes into a *beccafigo*, which last appears, as Gesner observes, about autumn, when the figs are ripe, and the former after the autumn. It is true Aristotle mentions some kinds of birds which go to warmer climates when they disappear, which is a proof that their migrations were not wholly unknown in those days; and indeed the poems of Homer prove that they were in part known much earlier. Nor could it happen otherwise, when the inquisitive genius of Greece began to work, and carry men into Phœnicia and Ægypt, with a view of improving themselves in all parts of learning; where they could not avoid observing, that some birds which left Greece in the winter were found at that time in those warmer climates.

But the superstition was already confirmed before this happened. Dodona was established on a foundation not to be shaken by the weak attempt of reason and experience. The birds had long given good advice, and brought many a general and a magistrate, as well as private men without number, out of difficulties; and therefore, whether they wintered in Egypt or not, signified little; and indeed it was only supposing them to go a little farther, and meet Jupiter at his annual visit to Æthiopia:

> *μεθ' αμυμονας Αιθιοπηας,*

and have the gift of prophecy conferred upon them, or confirmed. Agreeably to these notions we find several birds were looked upon as sacred to particular gods; thus the owl to Minerva, the peacock to Juno, the eagle to Jupiter, the crow to Apollo, whose messenger he was called, as appears by Hesiod.

Some will be apt to think that I have dwelt much longer upon this subject than it deserved; but I cannot help thinking, that even the infirmities of the human mind, especially such as have like this prevailed amongst the most ingenious and sagacious people, and for a long course of time influenced their most serious concerns, ought to be considered as not below our notice.

It may seem wonderful to some, that naturalists have been so long without being able to determine any thing certain about the state of several birds when they disappear *. The best writers have supposed

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* Since Mr. Stillingfleet wrote, the observations of different naturalists in various countries have concurred in determining the question relative to the migration of birds, or at least have reduced it to as great a degree of certainty as so doubtful a subject will admit. From these observations it appears that our islands form the winter-residence of many species from the northern regions, and the summer-residence of others from the south; that some migrate invariably at the same time, and probably to the same climates; others not. It is evident also, that many species change their habitations for the sake of breeding, some for food, and some on account of the season; but others are so irregular that it is impossible to ascertain the causes, or even the time of their movement; and even of those which migrate regularly individuals occasionally remain behind.

For more particular information we refer the reader to the writers on Natural History who have treated on this curious subject; and, above all, to Adanson, Barrington, Pennant, and White, in his interesting account of Selborne.

that *swallows* lie under water all winter; one of the latest ornithologists, a writer of great character, falls into this opinion, and the author of the following Calendar adopts it; and, indeed, till Adanson cleared up this point, it must have appeared problematical. But though the migration of this bird is at last determined; yet what becomes of the *nightingale*, the *cuckow*, the *goat-sucker*, and several others, is still undecided. Nor is this wonderful, though it may seem so; for the generality of mankind, and especially those who travel merely for the sake of a livelihood or a fortune, are so little solicitous about things of this kind, that the air might be filled with *swallows* in winter without their observing it, as was plainly the case at Senegal.

The number of birds that disappear in this kingdom is much greater than is generally imagined; especially if we reckon amongst them those which shift quarters at different seasons, but do not cross the seas. I shall not attempt to give a list of them, but recommend it to the curious, who live in the country to watch them more narrowly than they have hitherto been. Linnæus says, that most of that genus of birds, which he calls *motacillæ*, i. e. *those small birds which have a beak subulated and strait, with chaps nearly equal, nostrils of a pointed oval form, and tongue jaggedly indented*, live upon insects and not grain, and therefore migrate from the northern to the southern parts towards winter; but it appears that many birds migrate, not only in Sweden, but in Greece and other climates, that live with us all the year.

It is possible, that after all I have said, tending to revive natural augury, and after all the necessary observations shall have been registered, that no use can be made of it; but I am certain, that as long as men have ears and eyes, they must think that one of the greatest delights of the country, especially during the spring months, is owing to the lively motions, beautiful shapes and colours, and melodious notes of birds, which will afford more pleasure as they are more observed; and therefore I am not surprised that Peter the Great of Muscovy did not think it beneath his attention to endeavour to enliven his new seat of empire, by sending for colonies of them from other parts, as they were scarce where he resided.

I will finish this digression with a reflection that occurs to me on the different fates of natural and religious augury. The first was simple, unattended with any of those circumstances that are apt to rouse the passions of man; and therefore though likely to prove useful, if pursued with proper diligence, fell into neglect. The latter was complicated, applying itself to some of the strongest passions in man, and therefore, though unlikely, to a serious mind, to have the least foundation in truth, or ever to be useful, was encouraged and adorned with all the pomp that a superstitious people could invent in honour of a flattering, and therefore favourite art.

I shall now come to some points that more immediately relate to the following Calendars.

1. I have retained the Linnæan names of every plant and animal in the Swedish Calendar; and have added the English names to the plants * taken from Ray's Synopsis, and his history, with no small trouble, as any one will easily believe who has done the like. The numbers which follow the English names refer to the abovementioned books with an H. to distinguish the history.

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* The English names of plants were very vague, and indeterminate, even after the judicious exertions of Ray had done so much towards establishing a settled nomenclature. Mr. Stillingfleet pursued the same plan with great success, and Mr. Hudson adopted Mr. Stillingfleet's names in his Flora Anglica, and made many valuable additions. Mr. Hudson gave to the publick an arrangement of all the British Plants then known, methodized according to the system of Linnæus. He executed his work with much credit to himself, and advantage to the English Botanist; being well qualified for the arduous task, by a long and practical acquaintance with the subject, derived from frequent tours into various parts of England. Dr. Withering has made considerable improvements in the generic and specific names of plants, and would have laid the Botanic World under farther obligations, had not his time been much occupied by his extensive practice as a physician. This system of correct nomenclature has received very great amendments from the labours of Professor Martyn, who, in his admirable edition of Miller's celebrated Gardener's Dictionary, has not only improved, but extended it, as far as circumstances would admit, to the numerous new genera and species introduced into England since the time of Miller. We are solely indebted to Dr. Smith, who, in his most valuable Flora Britannica, has reduced many varieties to their true species, has corrected the generic and specific characters with his usual accuracy, and has added precise and clear descriptions.

The numbers after the English names of animals refer either to his Historia Avium, or Piscium, according to the subject *. I chose to refer to Ray, as well as barely give the English names, for the ease and satisfaction of such as put a due value on that inestimable writer, whose works do honour to our nation, as a late disciple of the great Swedish naturalist justly observes. I cannot help saying farther upon this occasion, that no writer till his time ever advanced all the branches of natural history so much as that sagacious, accurate, and diligent English observer, whose systematical spirit threw a light on every thing he undertook, and contributed not a little to those great and wonderful improvements which have been since introduced.

2. I have omitted most of the plants which are not natives of England, both because it is not easy to find English names for them which have any authority, and because I had scarcely any observations in my own Calendar, but on such plants as are native. Some foreign ones however I have retained, particularly such as are common in almost every garden! and such as are marked in the Calendar, as more than ordinary prognostics. These last are printed in large characters.

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* Some perhaps may think that I need not have referred to Ray for birds so well known as several mentioned in the Calendars; but the want of this caution in many authors, has produced great confusion and doubt about the things meant in every branch of natural history.

3. I have retained the division of months according to budding, leafing, flowering, &c. though I could not imitate this method in my own Calendar, for want of more experience; but I am convinced that this method marks more precisely when we may expect the flowering of any plant, or the return of any bird, &c. than the bare mention of the day of a common calendar month, and at the same time marks it more universally. Thus when Aristotle says *, That the nightingale sings continually day and night for fifteen days, about the time when the young leaves begin to expand and thicken the woods, he not only marks the time when they might expect to hear the nightingale in Greece, but in every other country. For thus it happens in Sweden and England, as may be seen in the following Calendars; whereas if he had said, it appeared in such a day of the month, it would bear true perhaps for that year only; in fact we find in the old almanacks the same author marking days very distant from one another, for the appearance of the same birds, and thus it must be likewise in relation to plants.

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* His words are οταν το ορος ηδη δασυνηται, i. e. when the mountain is thickening, where it is certain the word *mountain* is used for the trees which generally grow upon it. Thus Homer applies the word σκιοεντα to ουρεα for that reason, Iliad, A. 157; and Eustathius upon the place says: ἰστεον δε ὁτι, σκιοεντα μεν, ἀπο του παρακολουθεντος, λεγει. τα δασέα καὶ σκιας αποτελεστικα δια το της υλης λασιον. Pliny translates this passage, *densante se frondium germine.*

Ορος is evidently a corruption for οζος;—a *bud.*

Thus far for the Swedish Calendar. As to my own, 1st, I have marked every circumstance as I found it in my journal, and hope the learned reader will pardon any mistakes which might happen, either from want of judgment or attention. It is possible that I might put down some plants as first being in bud, or flower, or leaf, because I happened then first to observe them, or they might be in those states some time before in some place where I happened not to go.

2. I wanted such a guide as the ingenious author of the Swedish Calendar. My observations then perhaps might have been less unworthy of the public, as they would have been better directed to a particular purpose; but now the reader must expect to find in it all the imperfections that generally accompany first attempts of any kind.

3. I have caused all the prognostic plants, which are mentioned in my Calendar, to be printed in small capitals, as in the Swedish. The other marks I shall explain in a page by itself, for more easy reference.

4. These two Calendars would perhaps upon comparison have furnished me with some observations had I been able to find time sufficient for that purpose; but a strong desire to communicate them to the public early in the year, that others might be induced to keep journals of the same kind, determined me to send them out in this naked condition; and particularly as I am assured,

on very good authority, that such journals will be kept in Sweden, Germany, Italy, and France, the next year. I think therefore it would be pity, that an opportunity should be lost of making so curious a comparison between these different climates, and which perhaps may not occur again, or at least not for many years.

5. The observations on heat and cold were made with a thermometer, marked in a way peculiar to myself. The degrees are those of Farenheit, which I chose as being in common use, but instead of 32 I have made 0 the freezing point. This method is more simple, natural, and uniform, and conveys a more distinct idea to the mind. To this scale I have reduced the Swedish author's observations, as well as those of Dr. Hales, taken from his Vegetable Statics; who I am pleased to find has made use of the method above mentioned, in his late works, and I wonder it is not universally adopted. The degrees below 0 I have marked thus, 1.—2.—3. &c.

6. My botanical observations were made on plants growing in the fields chiefly; the Swedish, on plants growing in the Upsal-garden; which method is best, where either is in our power, I cannot determine. There are conveniences and inconveniences attending each; but there is one great convenience visibly on the side of the garden, which is, that the plants lie within a small compass, and therefore may be examined more surely and regularly every day.

7. If ever any use be made of Calendars of this kind, it must be by finding out, after a long series of observations, and publishing by itself, a list of a few regularly prognostic plants, either common in every field, if native; or, if not native, common in every garden. For it must be noted, that many plants will blow even in the depth of winter, if the weather be mild*. This is the case of *dandelion*, *chickweed*, *shepherd's purse*, *daisy*, *&c.* As for other precautions, I will refer the reader to the treatise on the Foliation of Trees.

This Calendar was made at the hospitable seat of my very worthy and ingenious friend Mr. Marsham, who has likewise made observations of this kind, and lately communicated to the world his curious observations on the growth of trees. All the country about is a dead flat; on one side is a barren black heath; on the other a light sandy loam; partly tilled, partly pasture-land, sheltered with very fine groves.

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* The variable climate of England renders it necessary to wait many successive years, and to take the mean as the best guide. Much information might be obtained by observing what plants continue in the latest perfection. The mildness of December 1806 afforded a very singular instance of strong vegetation: there were no less than twelve grasses in flower; and fifty-five other species not in a weakly state, but in full vigour. R.

THE

SWEDISH CALENDAR

OF

FLORA,

BY ALEXAND. MAL. BERGER.

Upsal, 1755. Latitude 59. 51.½

Poma dat autumnus, formosa est messibus æstas,
Ver præbet flores. OVID.

INTRODUCTION

TO

THE SWEDISH CALENDAR.

BEFORE I set forth the Calendar of Flora, or the delights of the year, arising from mere sublunary things according to its progress, and from observations made in the climate of Upsal in 1755, I think it necessary to say something by way of Introduction. Time moves on slowly; every thing is in progression and motion, and has its allotted period, as the wisest of men Solomon observes; to which purpose Virgil says,

Stat sua cuique dies.

Astronomers have exerted all their power to measure time. To them we owe the accurate divisions of it; for they, by observing the course and motion of the celestial bodies, have been at last enabled to reduce it to stated periods, and to divide it in such a manner into years, months, weeks, and days, that we have calendars constructed for common use, as a rule by which to observe and number its equal parts.

As the stars radiate, shine, and adorn the celestial regions of the summer months, so flowers beautify and illuminate the earth with a wonderful variety of bright and delightful colours. Thus, according to the style of the chymists, that which is above is as that which is below.

How much time soever and labour botanists have bestowed, in order to know the names, nature, and virtues of plants, they have not hitherto arrived at such a degree of perfection, as to equal the success of astronomers, in noting the properties and phænomena of each of them. Every flower has its appointed season. It would therefore be in vain for us to seek the spring plants in autumn, and the autumn plants in the spring. We see them at stated times emerging, stalking, flowering, fruiting, decaying. Again in another season we see others rising in their room, and that in so short a time, by so regular and constant a law, according to the direction of their natures, that it seems impossible for any one to behold this series and variety, without the highest admiration.

The sun at the same time that it raises, as it were, to life these beings that are destitute of animal functions, brings them forth also sooner or later, according to the nature and disposition of each; *i. e.* as this or that plan requires a lesser or a greater degree of heat before it can obtain its just maturity. For as eggs, differing in species, when sit on by a hen, will not all be hatched the same day, but some sooner, some later, so neither do flowers come forth together, but at stated times, as they shall have received the degree of heat proper to their natures.

Although the year was formed by the Creator in such a manner as to be divided into distinct parts, by the sun sending forth its rays equally on the surface of the earth; yet we are not from thence to define and measure the summer: the quantity of ice and snow and Northern colds hindering the air from being warmed equally soon in different years; and according to the heat of the air, the seasons are advanced or retarded. This is best known and measured by the various kinds of flowers.

Since therefore the summer season depends upon the greater or lesser degree of heat, so that flowers come forth proportionably to those different degrees, but yet in such a manner that one species follows another in a regular order; the seasons of the year, and particularly the summer, may easily be measured; which hitherto has been a desideratum, on account of œconomical uses, in spite of all the assistance from astronomers. Hence plants in different years often flower a month sooner or later; although, as I observed before, they still follow one another in their natural order, as far as the summer solstice; at which time they hardly ever differ in any year; and in the same manner they proceed, hasten on, or are retarded, the nearer they approach towards autumn, and the winter is farther off, or nearer at hand. Now in order to determine accurately the acceleration or retardation of the winter, we must observe all the different kinds of flowers in every place, at what time they first appear, and this daily, that the order which they observe may be better ascertained.

By way of specimen I have exhibited the flowers in the same order in which they appeared the last year, 1755, in the Upsal garden. I must observe, that almost all the plants mentioned in the following calendar grew in the open air, and in the same kind of soil, which is low and loamy, excepting about half a score, which were gathered in the woods not far distant, and which are with difficulty raised in the garden. I have marked the month and day all along on the side of the page; not meaning that any one should thence imagine that the flowers will return every year on the same day and month, but with intent to set forth the calendar of that individual year, and that it might appear with what diligence and circumspection it was made. In order to distinguish the cultivated plants from the wild, I have used *Italicks* for the first, and have marked the plants which appear to be most prognostic by small capitals. I have besides thought fit to dispose them all into months, according to a division the aptest I could contrive; but I did not think it necessary to form equal months, as my design was not to determine days, but chiefly, and indeed only, the greater or lesser acceleration of summer.

Having so accurately observed the flowers, I thought fit to add the time at which the animal kingdom undergoes certain alterations, such as when birds of passage come and go; when birds of every kind lay, or hatch, or moult; when several kinds of fishes celebrate their nuptials near the sea-shore, when it is sowing time, when grain flowers, ripens, &c. By the help of such observations we may at last know what is to be done, or observed, every day, by the flowering of plants. But much time is required to bring this to perfection; and he who observes, must, if he means to do any thing to the purpose, live in the country, where it is much easier to see every thing that presents itself.

If the gentlemen of our own or other countries took delight in such observations, they might amuse themselves very agreeably, by giving up some of their time to things of this kind; and I am most certainly persuaded, that this so slight a sketch, gaining continually new additions, would at last produce a work of great use; as it might furnish materials for directing private œconomy, and the more so as the times for sowing of seeds, reaping, and mowing, and gathering fruits of various kinds, might from thence be best settled.

Gardeners might thence learn at what time of the spring they ought to lay the roots of plants bare, when to sow their seeds, when to expose to the open air, and when to put under shelter their tender plants, and how to furnish the garden with flowering plants; so that there might be a perpetual blow all possible months of the year; thus the *lilac* follows the *cherry*, the *mock orange* follows the *lilac*, and the *late roses* follow the *mock orange*.

THE ORDER OF BLOWING OF THE BULBOUS PLANTS IN BORDERS, AND THEIR DURATION.

N. B. The *Snowdrop* is taken as a standard; the successive budding of the different plants is marked by figures on the left hand, while those on the right shew the duration of the blow. Thus, the figure 2. at Crocus signifies that it blows the second day; and the 12. at Hyacinth, that it blows on the twelfth after the *Snowdrop*; the 17. and 18. at the end of the line, shew that the bloom lasts as many days.

1. Snow-drops, 1144. H. Galanthus *nivalis*, 26.
Violet, *bulbous*, 1144. H. Leucoium *vernale*, 26.
2. Crocus, *spring*, 1174. H. Crocus *vernus*, 17.
12. Hyacinth, *oriental*, 1159. H. Hyacinthus *orientalis*, 18.

20. Fumitory, *bulbous*, 975. H. 4. Fumaria *bulbosa solida*, 20.

23. Hollow-root, 975. H. 5. Fumaria *bulbosa cava*, 20.

28. Hyacinth, *grape*, 1161. 28. H. Hyacinthus *botryoides*, 19.

34. Daffodil, *English*, 371. 2. Narcissus *pseudo-narcissus*, 19.

Daffodil, *sweet*, Narcissus *odorus*, S. N. 19.

37. Crown, imperial, 1105. H. Fritillaria *imperialis*, 10.

Fritillary, *Pyrenean*, 1107. H. Fritillaria *Pyrenaica*, 14.

38. Lilly, *chequer'd*, 1106. H. Fritillaria *meleagris*, 10.

44. Tulip, 1146. H. Tulipa *Gesneriana*, 13.

47. Primrose, *peerless*, 1133. H. Narcissus *poeticus*.

50. Hyacinth, *summer*, 1160. H. Hyacinthus *amethystinus*.

51. Hyacinth, *Spanish*, 1160. 21. H. Hyacinthus *cernuus*.

59. Star of Bethlehem, 1153. 9. H. Ornithogalum *umbellatum*.

68. Lilly, *fiery*, 1110. 3, 4, 5, 7. H. Lilium *viviparum*.

69. Moly, *yellow*, 1123, 4. H. Allium *moly*.

76. Martagon *of Pompony*, 1114. 7. H. Lilium *Pomponium*.

79. Star of Bethlehem, *spiked*, 1151, 1. H. Ornithogalum *Pyrenaicum*.

80. Corn flag, 1168. H. Gladiolus *communis*.

81. Martagon, *common*, 1112. H. Martagon *vulgare*, 15.

86. Martagon, *white*, 1112. Martagon *album*, 13.

100. Lilly, *white*, 1109. H. Lilium *album*.

111. Hyacinth, *dun-coloured,* 1160. 22. H. Hyacinthus *serotinus.*

113. Saffron, *meadow,* 373. Colchicum *autumnale.*

When many calendars of this kind shall be made in different places and nations in the same year, it will be easy to collect from the blowing of these sorts of flowers, and from the leafing of trees, how one climate differs from another, and why plants brought from the Southern parts seldom produce fruit with us, whereas the Northern plants succeed very well. Thus at Montpelier the spring is forwarder than at Upsal by 31 days, at London by 28, at Falconia by 6; and the winter comes on as much later in those places.

Botanists and apothecaries, whose business it is to gather plants just when they are in blow, may by this means learn at what time that may be done, and need not seek in vain at an improper season: they may farther know by their garden plants what wild ones are to be found in the fields precisely at the same time; and on the contrary.

The night frosts which so often destroy our plants, and which I imagine come to us from Lapland, may be known in the same way. Thus the LEAD cold arising from the thaws in Lapmarck, happens at the end of the leafing season. The BRASS cold from the snow melting in Lapland in the beginning of the fruiting season. The

IRON cold from the freezing on the Lapland alps in the middle of the sowing season. These colds do not happen with us the same night as in Lapland, but arrive in about eight days.

On these and such like calendars vulgar practical husbandry ought to be established; but the foundation hitherto not having been sufficiently well laid, this method is become so much out of use, that it is even looked upon as absurd and chimerical; nevertheless it may and ought to be carried so far, that no prudent œconomist will choose to be without such a guide; and the husbandman shall find it the surest way by which to regulate his affairs, not to mention other particulars.

THE

SWEDISH CALENDAR OF FLORA.

Made in the YEAR 1755.

THE MONTHS.

I. Reviving winter month from Dec. 22 to Mar. 19.
II. Thawing month from Mar. 19 to Apr. 12.

1. SPRING.

III. Budding month from April 12 to May 9.
IV. Leafing month from May 9 to May 25.
V. Flowering month from May 25 to June 20.

2. SUMMER.

VI. Fruiting month from June 20 to July 12.
VII. Ripening month from July 12 to Aug. 4.
VIII. Reaping month from Aug. 4 to Aug. 28.

3. AUTUMN.

IX. Sowing month from Aug. 28 to Sept. 22.
X. Shedding month from Sept. 22 to Oct. 28.
XI. Freezing month from Oct. 28 to Nov. 5.

4. WINTER.

XII. Dead winter month from Nov. 5 to Dec. 22.

THE

SWEDISH CALENDAR OF FLORA.

I. REVIVING WINTER MONTH.

From the winter solstice to the vernal æquinox.

Dec. XII.

xxii. *Butter shrinks and separates from the sides of the tub.*

xxiii. Asp flower buds begin to open.

Jan. I. i. *Ice on lakes begins to crack.*

ii. *Wooden walls snap in the night.*

Cold frequently extreme at this time, the greatest observed was 55. 7.

iv. * *Horse dung spirts.*

viii. *Epiphany rains.*

xxvi. *St. Paul's rains.*

Feb. II.

xxii. *Very cold nights often between Feb.* 20 *and* 28, *called* Steel Nights.

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* This was explained to me by Mr. Solander, an ingenious and learned disciple of Linnæus, now in England, who says, that horse dung, in very severe frosts, throws out particles near a foot high, and that no other dung does the like.

II. THAWING MONTH.

From the first melting of the snow to the floating of ice down the rivers.

> Vere novo gelidus canis cum montibus humor
> Liquitur, et zephyro putris se gleba resolvit.
> VIRG.

Mar. III.

xix. *Eves drop towards the noontide sun.*

Sallow, *round leaved,* flower buds, 449.15, Salix *caprea,* open.

xx. *Snow melts against walls.*

LARK *begins to sing.*

xxii. *Water flows by the walls.*

xxv. *Roads very dirty and full of water.*

April IV.

i. *Horse dung melts the ice.*

Moss, *upright fir.* Lycopodium *selago,* 106, sheds its dust.

iii. Stones *are loosened from the ice.*

vi. *Hills begin to appear, the snow being melted.*

Serpents come out of their holes.

SPIDER, *water, frisks about. The* FLY *creeps forth.*

GAME, *black,* 53. *Tetrao tetrix.*

LAPWING, 110. *Tringa vanellus, returns.*

vii. BUTTERFLY, *nettle, Papilio urticæ, appears in abundance.*

April IV.

Some people, says Pliny, think the appearance of the butterfly the surest sign of spring, on account of the delicacy of the animal.

vii. DUCK, *tame*, 145. *Anas boschas sits.*
Wild DUCK *returns.*

x. *An inundation of snow water.*
SWAN, 37. *Anas cygnus, and* DAKER-HEN, 58. 8. *Rallus crex, by their appearance proclaim the spring.*
Rivers *are unbound, and ice floats down.*

N. B. *The river at Upsal, for* 70 *years, has never been frozen beyond the* 19*th of April, according to the observation of O. Celsius, sen.*

PIKE, 112. *Esox lucius, spawns. This fish gives over spawning when the frog begins.*

xi. *Snow water soaks into the earth.*
Subterraneous places are inundated.
FROG *comes forth.*
Winter shelters ought to be removed from garden plants, that they may not be too much drawn up.
Hot beds for melons should be sown.

Solvitur acris hyems grata vice veris et Favonii.
HOR.

III. BUDDING MONTH.

From the return of the WHITE-WAGTAIL, *Motacilla alba,* 75. 1. *to the coming of the swallow ; or from the first flower to the leafing of the first tree, during the whole time of the flowering of the bulbous violet.*

A Favonio veris initium notant. CICERO.

April IV.

xii. Hasel-nut tree, 439. Corylus *avellana.*
COLTSFOOT, 173. Tussilago *farsara.*
xiii. Saffron, 374. Crocus *sativus.*
Violet, *bulbous,* 1144. H. Leucoium *vernale,* 26.
Snow drops, 1144. H. Galanthus *nivalis,* 26.
WAGTAIL, *white,* 75. 1. *Motacilla alba, returns.*
KESTREL, 16. 16. *Falco tinunculus, returns.*
FROG, 247. *Rana temporaria, croaks.*
Saffron, 374. Crocus *sativus,* 17.
xv. Pilewort, 246. Ranunculus *ficaria.*
Star of Bethlehem, *yellow,* 372. Ornithogalum *luteum.*
Grass, *whitlow,* 292. Draba *verna.*
Mezereon, 1587. H. Daphne *mezereon.*
TURKEY *hen,* 51. 3. *Meleagris gallopavo, sits.*
Honeysuckle, *double,* 1490. H. Lonicera *perfoliata.*
xvi. Liverwort, *noble,* 580. H. Anemone *hepatica,* 34.
The time for sowing barley at Upsal.
xvii. Lilly, *yellow water,* 368. 1. Nymphæa *lutea,* leaves emerge.
xix. Asp, or *trembling* poplar, 446. 3. Populus *tremula,* 13.

April IV.

xix. Abele, 446. 2. Populus *alba*, 13.
Hot-beds to be sown from the budding of the poplar to the leafing month.

xxi. Smelt, 66. 14. *Salmo eperlanus, spawns, at which time generally tempests and snowy weather at* Upsal, *and intermitting fevers very common.*

Hellebore, *black*, 271. 1. Helleborus *viridis.*

Willow, *round leaved.* 449. 15. Salix *caprea.*

xxx. Crake *berries.* 444. Empetrum *nigrum.*

Poplar, *black*, 446. Populus *nigra.*

Bur *butter*, 179. Tussilago *petasitis*, 25.

May V.

i. Mercury *dogs*, 138. 1. Mercurialis *perennis.*

Polyanthus, 1083. Primula veris *hortensis.*

iii. Anemone, *wood*, 259. 1. Anemone *nemorosa*, 21.

Saxifrage, *golden*, 158. 2. Chrysosplenium *alternifolium.*

Violet *with throat-wort leaves*, 365. 8. Viola *hirta.*

Assarabacca, 158. 1. Asarum *Europæum.*

Violet, *sweet*, 364. 8. Viola *odorata*, 24.

Pepperwort, 304. Lepidium *petræum.*

Fields are covered with verdure.

After the return of the Wheat Ear*, 75. 1. *Motacilla Oenanthe, there is seldom any severe frost, and therefore the peasants in Upland have this proverb : When you see the* White Wagtail, *you may turn your sheep into the*

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* If this bird does not quit England, it certainly shifts places. For I have observed, that about harvest time they were not to be found where there were before great plenty of them.

May V.

*fields *; and when you see the* Wheat Ear, *you may sow your grain.*

vii. Osier, 450. 21. Salix *viminalis.*
Bramble, 467. 1. Rubus *fruticosus,* leafs.
Starling, 67. 1. *Sturnus vulgaris, returns.*

viii. Moscatel, *tuberous,* 267. Adoxa *moscatellina.*
Seeds of kitchen plants to be sown. Tender plants to be taken out of the green-house.
Elm tree, 469. Ulmus *campestris.*
Snow melts even in the shade.

Diffugere nives, redeunt jam gramina campis,
Arboribusque comæ. Hor.

IV. LEAFING MONTH.

The complete leafing of trees from the bird cherry to the ash; from the coming of the swallow to the tulip.

Nunc herbæ rupta tellure cacumina tollunt;
Nunc tumido gemmas cortice palmes agit. Ovid.

May V.

ix. Swallow *and* Stork *return.*
Cherry, Bird, 463. Prunis *padus* †. L.

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* The sheep are housed all winter in Sweden, as Mr. Solander informs me, who gave me the translation of the Swedish proverb in the very words here printed.

† The letter L. at the end of the lines signifies that those plants came into leaf on the days marked. All the plants besides throughout this Calendar are supposed to have flowered on the days marked, unless the contrary is expressed.

May V.

ix. Filberd, 439. Corylus *avellana*. L.

xi. Asp, 446. 3. Populus *tremula, out of blow.*

xii. Cuckow, 23. *Cuculus canorus, sings.*

xiii. Sorrel wood, *281. Oxalis *acetosella.*

Birch tree, 443. Betula *alba*. L.

Barberry bush. 465. Berberis *vulgaris* L.

The best time for sowing barley and the seeds of garden plants.

Osier, 450. 21. Salix *viminalis*. L.

xiv. Spindle tree, 468. Euonymus *Europæus*. L.

Bear's ear, 1083. H. Primula *auricula*, 12.

Goule, or Dutch myrtle, 443. Myrica *gale*.

Orange, *mock*, 1763. H. Philadelphus *coronarius*. L.

Elder, *water*, 460. Viburnum *opulus*. L.

Lilac, 1763. H. Syringa *vulgaris*. L.

Privet, 463. Ligustrum *vulgare*. L.

Buckthorn, *sea*, 445. Hippophae *rhamnoides*. L.

Alder tree, 442. Betula *alnus*. L.

xv. Daffodil, *wild English*, 371. 1. Narcissus *pseudonarcissus*, 19.

Roses, *garden*.

Elm tree, 469. Ulmus *campestris*. L.

Nightingale, 78. *Motacilla luscinia, returns.*

Thorn, *white*, 453. 3. Cratægus *oxyacantha*. L.

Apple tree, 451. Pyrus *malus*. L.

Primrose, 284. Primula *veris*, 16 †.

Cherry tree, 463. Prunus *cerasus*, L.

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† The common Primrose is P. vulgaris Linn. and the Cowslip P. veris.

May V.

xv. Buck-thorn, 466. Rhamnus *catharticus*. L.

Cinquefoil, *small rough*, 323. Potentilla *verna*. 16.

xvi. Sallow, *round leaved*, 449. 15. Salix *caprea*. L.

Beam tree, *white*, 453. Cratægus *aria*. L.

Chesnut tree, *horse*, 1683. Æsculus *hippocastanum*. L.

Beech tree, 439. Fagus *sylvatica*. L.

Hornbeam, 451. Carpinus *betulus*. L.

Poplar, *black*, 446. Populus *nigra*. L.

xx. Asp, 446. Populus *tremula*. L.

xxi. Marygold, *marsh*, 272. Caltha *palustris*.

Lime tree, 473. Tilia *Europæa*. L.

Alder, *berry bearing*, 465. Rhamnus *frangula*. L.

Fly, *dragon*, *Moufet*, *p*. 67. *Libellula.*

Salmon, 63. 2. *Salmo salar.*

Oak tree, 440. Quercus *robur*. L.

Ash Tree, 469. Fraxinus *excelsior*. L.

xxiv. *While the ash is leafing there is scarcely any more frost : therefore green house plants ought to be brought into the open air.*

The Leaden Nights *happen before the leafing of the ash ; from that time the summer is settled.*

There are very few flowers in this month ; for Nature being intent on the young offspring of the bird kind, prepares abundance of flowers against the hatching season.

V. FLOWERING MONTH.

From the first ear of rye to its blow.

From the tulip, 1146. *Tulipa Gesneriana, to the wall pepper,* 270. 5. *Sedum acre.*

It ver, et Venus, et Veneris prænuncius ante
Pinnatus graditur zephyrus vestigia propter.

LUCRET.

May V.

xxv. † CHERRY, 463. Prunus *padus.*
Currants, *black,* 456. Ribes *nigrum.*
Jack by the hedge, 293. Erysimum *alliaria.*
Cicely, *wild,* 207. Chærophyllum *sylvestre.*
Tulip, 1146. H. Tulipa *Gesneriana,* 13.
Milkwort, *287. Polygala *vulgaris.*
Lady's Mantle, 158. Alchemilla *vulgaris.*
ROACH, 122. *Cyprinus rutilus, spawns.*
First ear of rye.

xxvi. Saxifrage, *white,* 364. 6. Saxifraga *granulata.*
Ivy, *ground,* 243. Glechoma *hederacea.*
Goldilocks, 248. Ranunculus *auricomus.*
Pear tree, 452. Pyrus *communis,* 14.

xxvii. Celandine, *greater,* 309. Chelidonium *majus.*
Cloud berries, 260. Rubus *chamæmorum.*
Cat's foot, 181. Gnaphalium *dioicum.*

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† While the bird cherry flowers, happens what is called the grey weather, between the old and new moon. I am indebted to Mr. Solander for the interpretation of this passage; it is in the original called the plenilunium cornicum; but ought to be read interlunium.

May V.

xxvii. Crane's Bill. 361. 18. Geranium *sylvaticum.*
Globe flower, 272. Trollius *Europæus.*

xxviii. Cuckow flower, 299. Cardamine *pratensis.*

While the cuckow flower blows, the salmon goes up the rivers, and dragon fly comes forth.

Thorn, *black*, 462. Prunus *spinosa* 10.
Cherry tree, 463. Prunus *cerasus*, 10.
Plumb tree, 462. 2, 3. Prunus *domestica.*
Pease, *wood*, 124. 2. Orobus *tuberosus.*
Plantain, *hoary*, 314. 3. Plantago *media.*

xxx. Butterwort, *281. Pinguicula *vulgaris.*
Lily in the valley, 264. Convallaria *Maialis*, 21.
Bugle, *mountain*, 245. 2. Ajuga *pyramidalis.*
Rush, *hare's tail*, 436. Eriophorum *vaginatum.*
Grass, *cotton*, 435. Eriophorum *polystachion.*
Honeysuckle, *dwarf*, 261. Cornus *Suecica.*
Whorts, *red*, 457. Vaccinium *vitis idæa.*
Crowfoot, Crane's Bill, 361. 18. Geranium *sylvaticum*, 120.
Catchfly, *red German*, 340.14. Lychnis *viscaria.*
Germander, *wild*, 282.11. Veronica *chamædrys.*
BREAM, 116. 5. *Cyprinus brama, spawns.*

The bream sports while the bird cherry fades, and the juniper begins to blow, and when this fades the dragon fly comes out.

Nunc frondent sylvæ, nunc formosissimus annus.

VIRG.

June VI.

i. Fir, *spruce*, 441. Pinus *abies*, drops its male flower.

ii. Peiony, 694. H. Pæonia fl. *simplici*, 10.
Avens, purple mountain, 253. Geum *rivale*.
Tormentil *septfoil*, 257. 1. Tormentilla *erecta*.
Apple tree, 451. Pyrus *malus*.
Rye in ear.

iii. Juniper tree, 444. Juniperus *communis*.
Quicken tree, 452. Sorbus *aucuparia*.
Buckbean, 285. Menyanthes *trifoliata*, 18.

iv. Grass, *fox-tail*, 396. 1. Alopecurus *pratensis*.

v. Plantain, *ribwort*, 314. 5. Plantago *lanceolata*.
Crane's bill, *dusky*, 361. 21. Geranium *phæum*.

vii. Orchis, *male handed*, 310. 19. Orchis *latifolia*.
Gooseberry bush, 1484. H. Ribes *grossularia*.
Paris, *herb*, 264. Paris *quadrifolia*.
Trefoil, *bird's foot*, 334. 1. Lotus *corniculata*.
Bilberry bush, *great*, 457. Vaccinium *uliginosum*.
Comfrey, 230. Symphytum *officinale*.
Flax, *purging*, 362. 6. Linum *catharticum*.
Columbines, 273. Aquilegia *vulgaris*.
Violet, *dame's*, 790. H. Hesperis *matronalis*.
Flora unrobed. The pear, plumb, Scotch fir and spruce out of blow.

The summer is then in its highest beauty when Pomona, dressed as it were in her snow-white garment, celebrates her nuptials; while the tulip, narcissus, and peiony adorn the garden, the fresh shoots of the fir illuminate the woods, and the juniper sheds its impregnating vapour.

June VI.

vii. Christopher, *herb*, 661. Actæa *spicata.*
Grass, *melic*, 403. 6. *Melica* nutans.
Bramble, *stone*, 261. Rubus *saxatilis.*
Crowfoot, *bulbous*, 247. 2. Ranunculus *bulbosus.*
Hawkweed, *dandelion*, 245. Leontodon *hispidum.*

viii. Barberry, 465. Berberis *vulgaris.*
Lilac, 176. H. Syringa *vulgaris.*
The meadows glow with crowfoots.

ix. Crane's bill, *dovefoot*, 359. 11. Geranium *molle.*

x. Flower-de luce, *yellow water*, 374. Iris *pseudacorus.*

xi. Crane's bill, *crowfoot*, 360. 17. Geranium *pratense.*
Bell flower, *lesser round-leaved*, 277. 5. Campanula *rotundifolia.*
Camomile, *Roman*, 189. Matricaria *chamomilla.*
Cinquefoil, *shrubby*, 256. 4. Potentilla *fruticosa.*

xii. Beam tree, *white*, 453. Cratægus *aria.*
Vetch, *kidney*, 325. 1. Anthyllis *vulneraria.*
Henbane, 274. Hyoscyamus *niger.*

xiii. Catchfly, *white*, 340. 11. Silene *nutans.*
Avens, 253. 1, 2. Geum *urbanum.*
Adonis, *flower*, 251. Adonis *annua rubra.*

The single peiony fades before the double blows, as is the case of rhubarb and rhapontic.

xiv. Lily, *yellow water*, 368. 1. Nymphæa *lutea.*
Orchis, *female handed*, 381. 20. Orchis *maculata.*
Robert, *herb*, 358. 6. Geranium *robertianum.*
Cinquefoil, *upright bastard*, 255. Potentilla *rupestris.*

June VI.
xiv. Campion, *white*, 339. 8. Lychnis *dioica*.
Elder, *water*, 460. Viburnum *opulus*.
xv. Rose, *pimpernel*, 454. 3. Rosa *spinosissima*.
Briar, *sweet*, 454. 2. Rosa *eglanteria*.
Thorn, *buck*, 466. Rhamnus *catharticus*.
Orchis, *lesser butterfly*, 380. 18. Orchis *bifolia*.
xvi. Grass of Parnassus, 355. 1. Parnassia *palustris*.
Grass, *marsh goose*, 255. 3. Galium *uliginosum*.
Lilly, *white water*, 368. 3. Nymphæa *alba*.
Tansey, *wild*, 256. 5. Potentilla *anserina*.
Alder, *berry bearing*, 465.1. Rhamnus *frangula*.
Peiony, double, 693. H. Pæonia *plena*, 13.
Rampions, 274. 4. Campanula *patula*.
Rhapontic, 170. H. Rheum *rhaphonticum*.
xvii. Pink, *meadow*, 338. Lychnis *flos cuculi*.
Valerian, *great wild*, 200.1. Valeriana *officinalis*.
Vetch, *chichling*, 320. 5. Lathyrus *palustris*.
Daisy, *great*, or *ox-eye*, 184. Chrysanthemum *leucanthemum*.
xvii. Eyebright, 284. Euphrasia *officinalis*.
Spear wort, *lesser*, 250. 7. Ranunculus *flammula*.
Groundsel, 178. 1. Senecio *vulgaris*.
Thorn, *white*, 453. Cratægus *oxyacantha*.
xviii. Lilly, *bulbous*, 1110. H. Lilium *bulbiferum* to VII. 4.
Saxifrage, *burnet*, 213. 1, 2. Pimpinella *saxifraga*.
Tormentil *cinquefoil*, 255. 2. Potentilla *argentea*.
Grass, *quaking*, 412. Briza *media*.

June VI.

xviii. Nightshade, *deadly*, 265. Atropa *belladonna*.

Rye, *winter*, 388. 1. Secale *hybernum*.

Winter rye flowers generally from the first blow of wall pepper, 270. 5. *Sedum acre, to the first blow of the rose bay willow herb.* 310. 1. *Epilobium angustifolium, with the bulbous lily, beginning oftentimes four days before the solstice.*

VI. FRUITING MONTH.

During the whole blow of the wall pepper. From the yellow to the red day lily.

> —— Revoluta ruebat,
> Matura jam luce dies. VIRG.

xx. Pepper, wall, 207. 6. Sedum *acre*.

Orchis, *frog*, 381. 22. Satyrium *viride*.

Cistus, *dwarf*, 341. Cistus *helianthemum*.

Lily, yellow day. 1191. H. Hemerocallis *flava*.

Cinquefoil, *marsh*, 256. 2. Comarum *palustre*.

xxi. *After the solstice trees scarcely grow, and therefore hedges should then be clipped. The highest degree of heat with us is hardly above* 54.8. *within the tropics the heat is not much above* 57.6. *nor below* 40.8. *the heat of a hatching hen between* 63 *and* 68.4. *a heat above* 72 *destroys the embryo.*

Brass nights *from the thaw of the highest mountains.*

xxii. Orchis, *fly*, 379. 13. Ophrys *insectifera myodes*, or *muscifera*.

xxii. Blue bottle, 198. Centaurea *cyanus.*
Vetch, *great tufted wood,* 322.4. Vicia *sylvatica.*
Dropwort, 259. Spiræa *filipendula.*
Thistle, *gentle,* 193. 2. Carduus *helenioides.*
Loose strife, *yellow,* 283. 3. Lysimachia *thyrsiflora.*
Self heal, 283. Prunella *vulgaris.*
Gentian, *vernal dwarf,* 275. 4. Gentiana *campestris.*

xxiii. Mayweed, *stinking,* 185. 4. Anthemis *cotula.*
Yarrow, 183. 1. Achillea *millefolium.*
Willow herb, *rose bay,* 310. Epilobium *angustifolium.*
Moonwort, 128. 1. Osmunda *lunaria.*
Liquorice, *wild,* 326. 1. Astragalus *alpinus.*
Knapweed, *great,* 198. 1. Centaurea *scabiosa.*
Vetch, *tufted,* 322. 3. Vicia *cracca.*
Nightshade, *woody,* 265. 1, 2. Solanum *dulcamara.*
Golden rod, 176. 1. Solidago *virgaurea.*
Orange, mock, 1763. H. Philadelphus *coronarius,* 14.
Sweet-william, 991. 2. H. Dianthus *barbatus.*
Poppy, *Turkey,* Papaver *orientale,* 13.
Flax, *perennial blue,* 362. 3. Linum *perenne.*
Dewberry bush, 467. 3. Rubus *cæsius.*

xxv. Nettle, *hedge,* 237. Stachys *sylvatica.*
Spiked willow of Theophrastus, 1699. H. Spiræa *salicifolia.*
Lilac out of blow.

June VI.

xxvi. Willow-herb, *hooded*, 244. 1. Scutellaria *galericulata.*

Willow herb, *great smooth leaved*, 311. 4. Epilobium *montanum.*

Twayblade, 385. 1. Ophrys *ovata.*

Strawberries ripening.

xxvii. Hawkweed, *Hungarian*, 167. 17. Hypochæris *maculata.*

Medic, *yellow*, 333. 1. Medicago *falcata.*

Parsley, *great bastard*, 219. 2. Tordylium *latifolium.*

xxviii. Toad flax, *yellow*, *281. 1. Antirrhinum *linaria.*

Grass, *sea dog*, 390. 1. Elymus *arenaria.*

Bryony, *white*, 261. 1, 2. Bryonia *alba.*

Campion, *wild purple*, 341. 17. Silene *armeria.*

xxix. Marygold, *corn*, 182. 1. Chrysanthemum *segetum.*

Heath, *Dutch, or besom*, 471. 4. Erica *tetralix.*

Bilberry bush, 457. 2. Vaccinium *myrtillus.*

Berries ripe.

Pease, *everlasting*, 319. 1. Lathyrus *latifolius.*

Throatwort, *little*, 277. 3. Campanula *glomerata.*

Feverfew, 187. 1. Matricaria *parthenium.*

Peacock *moults.*

Ox-eye, 183. 1. Anthemis *tinctoria.*

Sneezewort, 183. Achillea *ptarmica.*

Rupturewort, 160. 1. Herniaria *glabra.*

Hawkweed, *succory-leaved*, 166. 12. Crepis *biennis.*

June VI.

xxix. Pink, maiden, 335. 1. Dianthus *deltoides*.
Scabious, field, 191. 1. Scabiosa *arvensis*.
St. John's wort, *large flowered*, 1017. 1. H. Hypericum *ascyron*.
Elder tree, 461. 1. Sambucus *nigra*.
Woad, 367. 1. Isatis *tinctoria*, out of blow.

July VII.

i. Willow herb, *purple spiked*, 367. 1. Lythrum *salicaria*.
Parsnep, *cow*, 205. 1, 2. Heracleum *sphondylium*.
Bindweed, *small*, 275. 1. Convolvulus *arvensis*.
Knapweed, 198. 2. Centaurea *nigra*.
Mullein, *white flowered*, 287. 2. Verbascum *lychnitis alba*.
Rampions, 277. 4. Campanula *ranunculus*.

ii. Throatwort, *giant*, 276. Campanula *latifolia*.
Asphodel, *Lancashire*, 375. 1. Anthericum *ossifragum*.
Mullein, *black*, 288. 4. Verbascum *nigrum*.
Rue, *meadow*, 203. 1. Thalictrum *flavum*.
Hellebore, *bastard*, 383. 1. Serapias *helleborus palustris*.
The hottest days.
Bindweed, *great*, 275. Convolvulus *sepium*.
Willow herb, *yellow*, 282. 1. Lysimachia *vulgaris*.

iv. Moneywort, 283. 1. Lysimachia *nummularia*.
Foxglove, purple, 283. 1. Digitalis *rubra*.
Meadow sweet, 259. 1. Spiræa *ulmaria*.
Cockle, 338, 5. Agrostema *githago*.

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July VII.

iv. Speedwell, *spiked male.* 279. 2. Veronica *spicata.*

Grass, *soft tufted meadow,* 404. 14. Holcus *lanatus.*

Primrose, *evening or tree,* 862. Oenothera *biennis.*

vi. Yarrow, 183. 1. Achillea *millefolium.*

Bedstraw, yellow lady's, 224. 1. Galium *verum.*

Agrimony, 202. 1. Agrimonia *eupatoria.*

Throatwort, *great,* 276. Campanula *trachelium,* 25.

St. John's wort, 342. 1. Hypericum *perforatum.*

St. John's wort, *tutsan,* 343. 4, 5. Hypericum *hirsutum.*

Spearwort, *great,* 250. 8. Ranunculus *lingua.*

Carrot, 218. Daucus *carota.*

Stonecrop, *yellow,* 269. 1. Sedum *rupestre.*

Gladdon, *stinking,* 375. 3. Iris *fœtidissima.*

Knapweed, 198. 2. Centaurea *jacea.*

Hops, 137. 1. Humulus *lupulus.*

Rest harrow, 332. 1. Ononis *spinosa.*

Parsley, *Scotch sea,* 214. Ligusticum *Scoticum.*

vii. Briar, or dog rose, 454. 1. Rosa *canina.*

Rose, *white,* 1373. 23. H. Rosa *alba.*

Rose, *French.* Rosa *Gallica.*

The late roses now begin to blow.

Hay harvest begins with the lime tree, clover being out of blow, and yellow rattle, or coxcomb, *284. *shedding its seeds.*

July VII.

vii. Burnet, 203. 2. Sanguisorba *officinalis.*

Poppy, *wild,* 308. 1. Papaver *somniferum.*

Sneezewort, 183. 1. Achillea *ptarmica.*

Lily, *yellow day, out of blow.*

Chervil, *wild,* 207. 1. Chærophyllum *sylvestre, out of blow.*

Barley every where in ear.

Pease ripe.

Cherries ripe.

Beginning of hay harvest.

Motherwort, 239. 1. Leonurus *cardiaca.*

viii. Pink, *Deptford,* 337. 1. Dianthus *armerius.*

Orange, *mock, out of blow.*

Bilberries ripe.

ix. Thistle, *musk,* 193. 1. Carduus *nutans.*

Burdock, 196. Arctium *lappa.*

Horehound, *base,* 339. 1. Stachys *Germanica.*

Hemp, 138. Cannabis *sativa.*

351. 13. Frankenia *pulverulenta.*

Red currants ripe.

x. Mugwort, 190. 1. Artemisia *vulgaris.*

Thistle *ivy-leaved sow,* 162. 5. Prenanthes *muralis.*

Marjoram, *wild,* 236. 1. Origanum *vulgare.*

Horehound, *stinking,* 244. 1. Ballota *nigra.*

Basil, *great wild,* 239. Clinopodium *vulgare.*

Pine, *ground,* 244. Teucrium *chamæpitys.*

Betony, *water,* *283. 1. Scrophularia *aquatica.*

Nightshade, *enchanters',* 289. Circæa *canadensis.*

Clover, 328. 4. Trifolium *pratense, out of blow.*

July VII.

xi. Thistle, *tree sow*, 163. 7. Sonchus *arvensis*.
Lime tree, 473. 1, 2, 3. Tilia *Europea*, *out of blow*.
Marjoram, *wild*, 236. Origanum *vulgare*.

Festinat decurrere velox flosculus æstatis.

VII. RIPENING MONTH.

From the white stonecrop, 271. 7. *Sedum album, or the red day lily, to the devil's bit*, 191. 3. *Scabiosa succisa.*

xii. Succory, wild, 172. Cichorium *intybus*.
Willow herb, *great hairy*, 311. 2. Epilobium *hirsutum*.
Langue de bœuf, 166. 13. Picris *echioides*.
Woodbind, 456. Lonicera *perycIymenum*.
Mallow, *vervain*, 252. Malva *alcæa*.
St. John's wort, *large flowered*, 1017. H. Hypericum *ascyron*, *out of blow*.
xiii. Fleabane, *small*, 174. 2. Inula *pulicaria*.
Pepperwort, 304. 1. Lepidium *latifolium*.
xiv. Stonecrop, white, 271. 7. Sedum *album*, *out of blow*.
xv. Agrimony, *hemp*, 179. Eupatorium *cannabinum*.
Tansey, 188. Tanacetum *vulgare*.
Golden rod, *white* 175. 1. Erigeron *canadense*.
Saw-wort, 196. 1. Serratula *tinctoria præalta*.
Mint, *red*, 232. 5. Mentha *gentilis*.
Mint, *long-leaved horse*, 234. 5. Mentha *spicata*.
Pepper, *wall*, 270. 5. Sedum *acre*, *out of blow*.
CUCKOW *is silent*.

xvi. Hawkweed, *bushy*, 168. 3. Hieracium *umbellatum*.
Lily, *red day*, 1191. 2. H. Hemerocallis *fulva*.
All the marvels of Peru, 398. H. Mirabiles.
The height of hay harvest.
xvii. Thistle, *spear*, 194. 8. Carduus *lanceolatus*.
Elder, dwarf, 461. 4. Sambucus *ebulus*.
xviii. Touch me not, 316. 1. Impatiens *noli tangere*.
Saffron *meadow*, 373. 1. Colchicum *autumnale*. *Leaves fall.*
Teasel, *wild and manured*, 192. 3. Dipsacus *fullonum*.
xx. Lily, white, 1109. H. Lilium *candidum*.
Teasel, *small, wild*, 192. 3. Dipsacus *pilosus*.
xxi. Thistle, *marsh tree sow*, 163. 8. Sonchus *palustris*.
xxii. Soapwort, 339. 6, 7. Saponaria *officinalis*.
Grass, *Essex cock's foot*, 393. 4. Dactylis *cynosuroides*.
Knapweed, great, 198. 1. Centaurea *scabiosa*.
xxiii. Spikenard, *plowman's*, 179. 1. Conyza *squarrosa*.
xxiv. Elecampane, 176. 1. Inula *helenium*.
xxv. Fleabane, *middle*, 174. 1. Inula *dysenterica*.
xxvi. Violet, *Calathian*, 274. 1. Gentiana *pneumonanthe*.
Baum, 570. H. Melissa *officinalis*.
xxvii. Thistle, *great, soft, or gentle*, 193. 3. Serratula *alpina latifolia*.

Aug. VIII.

i. Chickweed, *berry-bearing*, 267. 1. Cucubalus *baccifer*.

Orpine, 269. 1. Sedum *telephium*.

Mirabar celerem fugitiva æstate rapinam,
Et dum nascuntur consenuisse rosas.

VIII. REAPING MONTH.

From the devil's bit to the blow of the meadow saffron.

iv. Devil's bit, 191. 3. Scabiosa *succisa*.

Rye harvest.

Winter rye has for many years ripened with the first blow of the devil's bit, in the garden at Upsal.

Birds of passage, *after having celebrated their nuptials in the vernal months, and feasted on the summer-fruits, now prepare for departing.*

vii. Rose, *French.* Rosa *Gallica*, *out of blow.*

xiv. Wormwood, 188. 1. Artemisia *campestris.*

xvi. *Barley harvest.*

xxvi. Lily, *red*, *out of blow.*

IX. SOWING MONTH *.

From the first blow of the meadow saffron to the departure of the swallow.

Pomifer autumnus fruges effudit, et mox
Bruma recurrit iners.

Aug. VIII.

xxviii. Saffron, meadow, 373.1. Colchicum *autumnale.*
This plant ought to admonish gardeners to put Indian plants under shelter, as the iron nights are near. The IRON NIGHTS, *as they are called with us, generally happen between August* 17 *and* 29, *and destroy tender plants.*
After the blow of the meadow saffron, we have storms that shake off ripe seeds.

Fern, female, 124. 1. Pteris *aquilina, grows yellow in the woods after the first cold nights.*

xxxi. *A gentle frost that scarcely did any damage.*

Sept. IX.

i. Adonis flower, 251. 1. Adonis *annua ser.*
Mulberry tree, 1429. H. Morus *nigra, grows pale.*

iv. Fig tree, 1431. H. Ficus *carica grows pale.*

vi. Wormwood, sea, 188. 2. Artemisia *maritima.*
Traveller's joy, 258. 1. Clematis *vitalba.*

xi. *The frost has destroyed southern plants.*

xii. *The frost milder.*

xiv. *Seeds to be gathered.*

---

* By sowing, in this place, is meant not man's but nature's.

Sept. IX.

Sampire, *golden flowered,* 174. 1. Inula *crithmoides.*

* Swallow *goes under water.*

Wagtail, *white, departs.*

Nos quoque floruimus, sed flos fuit ille caducus.

X. SHEDDING MONTH.

From the first fall of the leaves of trees to the last.

xxii. Orach, *sea,* 152. 8. Artiplex *maritima.*

Leaves of trees are changed, of the oak, maple, robinia caragana, elm, lime, to a yellow; of the spin tree to a brown; of the quicken tree and sumach to a red colour.

Leaves of the oak dry and yellow.

xxiv. † *Leaves of the maple begin to fall in the night.*

xxv. *Hoar frost.*

xxvi. *Leaves of the robinia caragana fall.*

Sycamore *stripped of its leaves.*

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* Adamson, in the account of his voyage to Senegal, p. 121. says, that Oct. 1749, European swallows lodged on the vessel in which he went from Goree to Senegal, and that they are never seen there but at this time of the year, along with quails, wagtails, kites, and some other birds of passage, and do not build nests there. This testimony seems to take away all doubts about this long contested point.

† Geminus, either from himself or Democritus, which is much the same, as Rome and Abdera were nearly in the same latitude, says that the leaves of trees began to drop the fourth of Scorpio, which answers to October 28.

Oct. X.

iv. Cherry, *bird, stripped of its leaves.*

v. *A storm.*

vi. *Green leaves of the ash fall. When they fall, southern plants ought to be put under shelter.*

vii. Elm *is stripped.*

A storm.

Frost.

xii. *The leaves of the lime tree fall.*

Green houses ought to be shut.

xiii. *The asp tree still in leaf.*

xiv. *Ice.*

xvii. *Hasel nut tree stripped.*

xxv. Abele, 446. 2. Populus *alba, stripped.*

xxvi. Saffron, *meadow, just out of blow.*

Poplar, *black, stripped.*

xxvii. *Summer ended.*

xxviii. *Sallows only in leaf.*

> Vernantesque comas tristis ademit hyems.
>
> PETRON.

XI. FREEZING MONTH.

From the last shedding of leaves to the last green plant.

Iva *annua.*

Nov. XI.

ii. *Alternate snow and frost.*

v. Milleria *quinqueflora.*

Thaw with rain.

Nov, XI.

The earth covered with snow.
Rivers are frozen.
Snow with a thaw.
Firm snow.
Thaws again.
Ditches filled with water.
Winter thoroughly settled.

Heu quam cuncta abeunt celeri mortalia cursu.

XII. DECLINING WINTER MONTH.

From the last green plant to the winter solstice.

v. *Mosses and lichens only flourish.*
Thermometer, gr. 34. 2.
vi. *Thaws.*
xx. *Cold changeable weather.*

Quælibet orta cadunt, et finem cæpta videbunt.

THE
ENGLISH CALENDAR
OF
FLORA.

BY BENJAMIN STILLINGFLEET.

Made at STRATTON in NORFOLK, in 1755. Lat. 52° 45′.

MARKS EXPLAINED.

b signifies buds swelled.
B ——— buds beginning to open.
f ——— flowers beginning to open.
F ——— flowers full blown.
l ——— leaves beginning to open.
L ——— leaves quite out.
r. p. —— fruit nearly ripe.
R. P.—— fruit quite ripe.
E ——— emerging out of the ground.
D ——— flowers decayed.

THE

ENGLISH CALENDAR OF FLORA.

I. MONTH.

Reviving Nature seems again to breathe,
As loosen'd from the cold embrace of death.

Jan. 5. Rosemary, 515. H. Rosmarinus *officinalis*. f.
17. Honeysuckle, 458. Lonicera *Periclymenum*, l.
Archangel, *red*, 240. 2. Lamium *purpureum*, F.
Haselnut tree, 439. Corylus *Avellana*, f.
Honeysuckle, 458. Lonicera *periclymenum*, L.
Laurustinus, 1690. H. Viburnum *Tinus*, F.
Holly, 466. Ilex *Aquifolium*, f.
26. Snow drops, 1144. H. Galanthus *nivalis*, F.
Chickweed, 347. 6. Alsine *media*, F.
Spurry, 351. 7. Spergula *arvensis*, F.
Daisy, 184. Bellis *perennis*, F.

II. MONTH.

Love's pleasing ferment gently now begins
To warm the flowing blood.

Feb. 4. WOOD LARK, 69. 2. *Alauda arborea, sings.*
Elder tree, 461. Sambucus *nigra*, f.
12. ROOKS, 39. 3. *Corvus frugilegus, begin to pair.*
GEESE, 136. 1. *Anas Anser, begin to lay.*
*WAGTAIL, WHITE, 75. 1. *Motacilla alba appears.*
16. THRUSH, 64. 2. *Turdus musicus, sings.*
†CHAFFINCH, 88. *Fringilla cœlebs, sings.*
20. *Thermometer*, 11. *Highest this month.*
Thermometer, 2. *Lowest this month.*
22. PARTRIDGES, 57. *Tetrao Perdix, begin to pair.*
Hasel tree, 439. Corylus *Avellana*, F.
25. Gooseberry bush, 1484. H. Ribes *grossularia*, l. } both young plants.
Currant, *red*, 456. 1. Ribes *rubrum*, l. }

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* The wagtail is said by Willoughby to remain with us all the year in the severest weather. It seems to me to shift its quarters at least, if it does not go out of England. However, it is certainly a bird of passage in some countries, if we can believe Aldrovandus, the author of the Swedish Calendar, and the author of the treatise De Migrationibus Avium. Linnæus observes, S. N. Art. Motacilla, that most birds which live upon insects, and not grains, migrate.

† Linnæus says, that the female chaffinch goes to Italy alone, through Holland; and that the male in the spring, changing its note, foretells the summer: and Gesner, Ornithol. p. 388, says, that the female chaffinch disappears in Switzerland in the winter, but not the male.

Feb. II.

Thermometer from the 19*th to the* 25*th, between* 0 *and* -1 *with snow.*

Wind during the latter half of the month between E. and N.

III. MONTH.

Winter still ling'ring on the verge of Spring,
Retires reluctant, and from time to time
Looks back, while at his keen and chilling breath
Fair Flora sickens.

March

2. ROOKS, 39. 3. *Corvus frugilegus begin to build.*
Thermometer, 10.

4. THRUSH, 64. 2. *Turdus musicus, sings.*
Thermometer, 11.

5. DOVE, RING, 62. 9. *Columba Palumbus, cooes.*

7. *Thermometer*, 0. *Lowest this month.*

11. Sallow, Salix, F.
Laurustinus, 1690. H. Viburnum *Tinus*, l.
* BEES, *Apis mellifera, out of the hive.*
Laurel, 1549. H. Prunus *Laurocerasus*, l.
Bay, 1688. H. Laurus *nobilis*, l.

20. *Vernal equinox.*

21. Grass, *scurvy*, 302. 1. Cochlearia *officinalis*, F.
Asp, 446. 3. Populus *tremula*, F

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* Pliny, Nat. Hist. lib. 11. § 5. says, that bees do not come out of their hives before May 11, and seems to blame Aristotle for saying that they come out in the beginning of spring, i. e. March 12.

March.
26. Speedwell, *germander*, 279. 4. Veronica *agrestis*, F.
Alder, 442. Alnus *Betula*, F.
28. Violet, *sweet*, 364. 2. Viola *odorata*, F.
Parsnep, *cow*, 205. Heracleum *Sphondylium*, E.
Pilewort, 296. Ranunculus *Ficaria*, F.
Thermometer, 25. 50. *Highest this month.*
29. Cherry tree, 463. Prunus *Cerasus*, B.
Currant bush, 456. 1. Ribes *rubrum*, B.
Primrose, 284. 1. Primula *veris*, F.
Yew tree, 445. Taxus *baccata*, F.
Elder, *water*, 460. Viburnum *Opulus*, B.
Thorn, haw, 453. 3. Cratægus *Oxyacantha*, B.
Larch tree, 1405. H. Pinus *Larix*, B.
Hornbeam, 451. Carpinus *Ostrya*, B.
Tansy, 188. Tanacetum *vulgare*, E.

IV. MONTH.

——— Airs, vernal airs,
Breathing the smell of grove and field, attune
The trembling leaves. MILTON.

April 1. Chesnut, *horse*, 1683. Æsculus *Hippocastanum*, B.
Birch, 443. Betula *alba*, L.
Willow, *weeping*, Salix *Babylonica*, L.
Elm tree, 468. Ulmus *campestris*, F.
Quicken tree, 452. 2. Sorbus *aucuparia*, f.
Apricot, 1533. H. Prunus *Armeniaca*, F.

April.

1. Narcissus, *pale*, 371. 2. Narcissus *pseudo-narcissus.*
3. Holly, 466. 1. Ilex *Aquifolium*, f.
Bramble, 467. 1. Rubus *fruticosus*, L.
Rasberry-bush, 467. 4. Rubus *idæus*, L.
Currants, *red*, 456. Ribes *rubrum*, F.
Dandelion, 170. 1. Leontodon *taraxacum*, E.
Cleavers, 225. Galium *Aparine*, E.
4. Laurustinus, 1690. H. Viburnum *Tinus*, F.
Apple tree, 451. 1, 2. Pyrus *Malus*, B.
Orpine, 269. 1. Sedum *Telephium*, B.
Briar, 454. 1. Rosa *canina*, L.
6. Gooseberry, 1489. H. Ribes *Grossularia*, f.
Maple, 470. 2. Acer *campestre*, B.
Peach, 1515. H. Amygdalus *Persica*, L. et F.
Apricot, 1533. H. Malus *Armeniaca*, L.
Plumb tree, 462. Prunus *præcox*, L.
Pear tree, 452. Pyrus *communis*, B.
*SWALLOW, 71. 2. Hirundo *urbica*, *returns.*
7. Filberd, 439. Corylus *Avellana*, L.
Sallow, Salix, L.
Alder, 442. 1. Betula *Alnus*, l.
Lilac, 1763. Syringa *vulgaris*, l.
Oak, 440. 1. Quercus, *Robur*, f.
Willow, *weeping*, Salix, *babylonica*, b.
8. Juniper, 444. Juniperus *communis*, b.

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* According to Ptolemy, Swallows return to Ægypt about the latter end of January.

April.

9. Lilac, 1763. Syringa *vulgaris*, b.
Sycamore, 470. Acer *Pseudoplatanus*, L.
Wormwood, 188. 1. Artemisia *Absinthium*, E.
* NIGHTINGALE, 78. *Motacilla Luscinia, sings.*
Auricula, 1082. H. Primula *Auricula*, b.
10. Bay, 1688. H. Laurus *nobilis*, L.
Hornbeam, 451. Carpinus *Betulus*, b.
Willow, *white*, 447. 1. Salix *alba*, b.
BEES *about the male sallows.*
Feverfew, 187. 1. Matricaria *Parthenium*, E.
Dandelion, 170. 1. Leontodon *taraxacum*, E.
Hound's tongue, 226. 1. Cynoglossum *officinale*, E.
Elm, 468. Ulmus *campestris*, l.
Anemone, *wood*, 259. Anemone *nemorosa*, F.

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* From morn till eve, 'tis music all around;
Nor dost thou, Philomel, disdain to join,
Even in the mid-day glare, and aid the quire.
But thy sweet song calls for an hour apart,
When solemn Night beneath his canopy,
Enrich'd with stars, by Silence and by Sleep
Attended, sits and nods, in awful state;
Or when the Moon in her refulgent car
Triumphant rides amidst the silver clouds,
Tinging them as she passes, and with rays
Of mildest lustre gilds the scene below;
While zephyrs bland breath through the thickening shade,
With breath so gentle, and so soft, that e'en
The poplar's trembling leaf forgets to move,
And mimic with its sound the vernal shower;
Then let me sit, and listen to thy strains, &c.

April.

10. Jack in the hedge, 291. Erysimum *Alliaria*, E.
Quince tree, 1452. H. Pyrus *Cydonia*, E.

11. Elder, *water*, 460. Viburnum *Opulus*, L.
Alder, *berry bearing*, 465. Rhamnus *Frangula*, L.

12. Acacia, 1719. H. Robinia *Acacia*, l.
Mulberry tree, 1429. H. Morus *nigra*, l.
Lime tree, 473. 1, 2, 3. Tilia *europæa*, l.
Mercury, *dogs*, 138. 1. Mercurialis *perennis*, F.
* Elm, *wych*, 469. 4. L. Ulmus *montana*.
Ragweed, 177. Senecio *Jacobæa*, E.

13. Laburnum, 1721. Cytisus *Laburnum*, f.
Strawberry, 254. Fragaria *vesca*, F.
Quicken tree, 452. 2. Sorbus *aucuparia*, L.
Sycamore, 470. Acer *pseudoplatanus*, L.
Laurel, 1549. H. Prunus *Laurocerasus*, L.
Gooseberry bush, 1484. H. Ribes *Grossularia*, F.
Currant bush, 456. 1. Ribes *rubrum*, F.
Mallow, 251. 1. Malva *sylvestris*, E.
Hornbeam, 451. Carpinus *Betulus*, L.

14. Flixweed, 298. 3. Sisymbrium *Sophia*, E.
Apple tree, 451. Pyrus *Malus*, L.
Hops, 137. 1. Humulus *Lupulus*, E.
Plane tree, 1706. H. Platanus *orientalis*, b.
Walnut tree, 438. Juglans *regia*, f.
BITTERN, 100. 11. Ardea *stellaris*, *makes a noise*.

15. Vine, 1613. Vitis *vinifera*, B.
Turneps, 204. 1. Brassica *Rapa*, F.

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* Linnæus does not seem to know this species of elm.

April.

16. Abele, 446. 2. Populus *alba*, B.
Chesnut, 138. 2. H. Fagus *Castanea*, B.
Ivy, *ground*, 243. Glechoma *hederacea*, F.
Fig tree, 1431. Ficus *Carica*, b.
Apricots and peaches out of blow.
Redstart, 78. 5. Motacilla *Phœnicurus*, *returns.*
Tulip tree, 1690. H. Liriodendron *Tulipifera*, B.
Plumb tree, 462. Prunus *domestica*, F.
Sorrel, *wood*, *281. 1, 2. Oxalis *acetosella*, F.
Marygold, *marsh*, 272. Caltha *palustris*, F.
Laurel, *spurge*, 465. Daphne *Laureola*, F.

17. Jack in the hedge, 291. 2. Erysimum *Alliaria*, F.
Willow, *white*, 447. 1. Salix *alba*, L. et F.
Cedar, 1404. H. Pinus *Cedrus*, l.
Elder, *water*, 460. 1. Viburnum *Opulus*, f.
Abele, 446. 2. Populus *alba*, L.
* Cuckow, 23. Cuculus *canorus*, *sings.*

18. Oak, 440. 1. Quercus, *Robur*, l. F.
Thorn, *black*, 462. 1. Prunus *spinosus*, B.
Pear tree, 452. Pyrus *communis*, f.
Mulberry tree, 1429. H. Morus *nigra*, B.
Violet, *dog*, 364. 3. Viola *canina*, F.
Lime tree, 413. 1, 2, 3. Tilia *Europæa*, L.
Nightshade, 265. Atropa *Belladonna*. E.
Cherry tree, 463. 1. Prunus *Cerasus*, F.

*** Aristophanes says, that when the cuckow sung, the Phœnicians reaped wheat and barley. Vide Aves.**

April.

18. Ash tree, 469. Fraxinus *excelsior*, f.
Maple, 470. Acer *campestre*, L.
Broom, 474. Spartium *scoparium*, b.
Chesnut, 138. 2. Fagus *Castanea*, L.
Fir, *Scotch*, 442. Pinus *sylvestris*, b.
Cuckowflower, 299. Cardamine *pratensis*.

20. *Thermometer* 42. *the highest this month.*

21. Walnut tree. 438. Juglans *regia*, L.
Plane tree, 1706. H. Platanus *orientalis*, L.
Fir, *Weymouth*, 8. dend. Pinus *Tæda*, B.
Acacia, 1719. H. Robinia *pseudo-acacia*, L.
Fig-tree, 1431. H. Ficus *Carica*, L.
Wall flower, 291. Cheiranthus *cheiri*, F
Poplar, *black*, 446. 1. Populus nigra, L.
Beech tree, 439. 1. Fagus *sylvatica*, L.

22. Fir, *balm of Gilead*, Pinus *balsamia*, l. et f.
Young Apricots.
Fir, *Scotch*, 442. Pinus *sylvestris*, f.
Ash, 469. Fraxinus *excelsior*, F. et L.
Broom, 474. Spartium *scoparium*, L.
Poplar, *Carolina*, L.
Meadow, sweet, 259. Spiræa *Ulmaria*, E.
Fig tree, 1431. H. Ficus *Carica*, *fruit formed.*
Tormentil, 257. 1. Tormentilla *erecta*, E.
Phyllirea, 1585. H. Phyllirea *latifolia*, F.
Thorn, *evergreen*, 1459. H. Mespilus *Pyracantha*, F.
Rosemary, 515. H. Rosmarinus *officinalis*, F.
Campion, *white*, 339. 8. Lychnis *dioica*, F,
Buckbean, 285. 1. Menyanthes *trifoliata*, F.

April.

22. Furze, *needle*, 476. 1. Genista *anglica*, F.
Stitchwort, 346. 1. Stellaria *holostea*, F.
23. Crab tree, 451. 2. Pyrus *Malus sylvestris*, F.
Apple tree, 451. 1. Pyrus *Malus*, f.
Robert, *herb*, 358. Geranium *robertian*, F.
Fieldfares, 64. 3. *Turdus pilaris*, *still here.*
24. Broom, 474. Spartium *scoparium*, F.
Mercury, 156. 15. Chenopodium *bonus henricus*, F.
Yew tree, 445. Taxus *baccifera*, L.
Holly, 466. 1. Ilex *Aquifolium*, B.
Furze, 475. Ulex *europæus*, l.
Agrimony, 202. Agrimonia *Eupatoria*, E.
25. Sycamore, 470. Acer *pseudoplatanus*, F.
Hornbeam, 451. Carpinus *Betulus*, F.
Asp, 446. Populus *tremula*, l.
Spurge, *sun*, 313. 8. Euphorbia *Peplus*, F.
Elder tree, 461. 1. Sambucus *nigra*, f.
Nettle, 139. Urtica *dioica*, F.
Bindweed, *small*, 275. 2. Convolvulus *arvensis*, E.
Fir, *balm of Gilead*, Pinus *balsamea*, L.
Cicely, *wild*, 207. 1. Chærophyllum *sylvestre*, F.
Young currants and gooseberries.
26. Plantain, *ribwort*, 314. 5. Plantago *lanceolata*, F.
Germander, *wild*, 281. 11. Veronica *chamædrys*, F.
Cuckow pint, 266. Arum *maculatum*, *spatha out.*

April.

26. Holly, 466. Ilex *Aquifolium*, F.
Harebells, 373. 3. Hyacinthus *nonscript*, F. [Scilla nutans, E. B. 377.]

27. Lilac, 1763. H. Syringa *vulgaris*, F.
Crane's bill, *field*, 357. 2. Geranium *cicutarium*, F.
St. John's wort, 342. 1. Hypericum *perforatum*, E.
Betony *water*, 283. 1. Scrophularia *aquatica*, E.
Bryony, *white*, 261. Bryonia *alba*, E.
Birch tree, 443. 1. Betula *alba*, F.

28. Jessamine, 1599. 1. H. Jasminum *officinale*, l.
Thorn, *white*, 453. 3. Cratægus *Oxyacantha*, f.
* BLACK CAP, 79. 12. *Motacilla atricapilla*, *sings*.
† WHITE THROAT, 77. Motacilla *sylvia*.
Juniper, 444. 1. Juniperus *communis*, f.
Rasberry bush, 467. 4. Rubus *idæus*, f.
Quince tree, 1452. H. Malus *Cydon*, f.
‡ Crowfoot, *sweet wood*, 248. 1. Ranunculus *auricomus*, F.

29. Bugle, 245. Ajuga *reptans*, F.
Bay, 1688. H. Laurus *nobilis*, f.

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* The black cap is a very fine singing bird, and is by some in Norfolk called the mock nightingale. Whether it be a bird of passage I cannot say.

† I have some doubt whether this bird be the Sylvia of Linnæus, though the description seems to answer to Ray's, and to one of my own, which I find among my papers. [It is so classed by Pennant.]

‡ Called Goldilocks in the Swedish Calendar, p. 427.

April.

29. *Peas and beans,* f.

Snow.

Chervil, *wild,* 207. 1. Chærophyllum *temulentum,* f.

Parsnep, *cow,* 205. 1. Heracleum *Sphondylium,* f.

Pine, *manured,* 1398. 1. H. Pinus *Pinea,* f.

30. *Snow.*

[*] *Thermom. 5. The lowest this month.*

V. MONTH.

All that is sweet to smell, all that can charm
Or eye or ear, bursts forth on every side,
And crowds upon the senses.

May 1. Crosswort, 223. 1. *Valantia cruciata,* F.

Avens, 253. 1. Geum *urbanum,* F.

Mugwort, 191. 1. Artemisia *campestris,* E.

Bay, 1688. H. Laurus *nobilis,* L.

3. Lily of the valley, 264. Convallaria *maialis,* f.

Violet, *water,* 285. Hottonia *palustris,* F.

4. Lettuce, *lambs,* 201. Valeriana *locusta,* F.

Tulip tree, Liriodendron *Tulipifera,* L.

Hound's tongue, 226. 1. Cynoglossum *officinale.*

Cowslips, 284. 3. Primula *veris,* F.

Valerian, *great wild,* 200. 1. Valeriana *officinalis,* F.

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[*] Vernal heat, according to Dr. Hales, at a medium, is 18.25.

May.

4. Rattle, *yellow*, 284. 1. Rhinanthus *Cristagalli*, F.
Ice.
Thermom. 8. *The lowest this month.*
Fir, *silver*, *buds hurt by the frost.*
5. Twayblade, 385. Ophrys *ovata*, f.
Tormentil, 257. Tormentilla *erecta*, F.
Celandine, 309. Chelidonium *majus*, E.
Betony, 238. 1. Betonica *officinalis*, E.
6. Oak, 440. Quercus, *Robur*, F. et L.
Time for sowing barley.
Saxifrage, *white*, 354. 6. Saxifraga *granulata*, F.
Ash, 469. Fraxinus *excelsior*, f.
Ramsons, 370. 5. Allium *ursinum*, F.
Nettle, *white*, 240. 1. Lamium *album*, F.
Quicken tree, 452. 2. Sorbus *aucuparia*, F.
7. Fir, *Scotch*, 442. Pinus *sylvestris*, F.
8. Woodruffe, 224. Asperula *odorata*, F.
9. Chesnut tree, 1382. H. Fagus *Castanea*, f.
10. Celandine, 309. Chelidonium *majus*, F.
Solomon's seal, 664. Convallaria *Polygonatum*, F.
Thorn, *white*, 453. 3. Cratægus *Oxyacantha*, F.
11. Maple, 470. 2. Acer *campestre*, F.
Roses, *garden*, f.
12. Barberry bush, 465. Berberis *vulgaris*, F.
Chesnut, *horse*, 1683. H. Æsculus *Hippocastanum*, F.
Buglos, *small wild*, 227. 1. Lycopsis *arvensis*, F.

May.

13. Grass, *water scorpion*, 229. 4. Myosotis *scorpioides*, F.
Quince tree, 1452. H. Pyrus *Cydonia*, F.
Cleavers, 225. Galium *Aparine*, F.
14. Mulberry tree, 1429. H. Morus *nigra*, L.
Asp, 446. 3. Populus *tremula*, l.
Crowfoot *bulbous*, 247. 2. Ranunculus *bulbosus*, F.
Butter cups, 247. Ranunculus *repens*, F.
15. *Young turkies.*
Lime tree, 473. Tilia *europæa*, f.
Milkwort, *287. 1, 2. Polygala *vulgaris*, F.
Crane's bill, 359. 10. Geranium *molle*, F.
Walnut, 1376. H. Juglans *regia*, F.
16. Mustard, *hedge*, 298. 4. Erysimum *officinale*, F.
20. Bryony, *black*, 262. 1. Tamus *communis*, F.
Many oaks, and more ashes and beeches, still without leaf.
Violet, *sweet*, 364. 1. Viola *odora*, D.
Stitchwort, 346. Stellaria *holostea*, D.
Anemone, *wood*, 259, 1. Anemone *nemorosa*, D.
Cuckow flower, 299. 20. Cardamine *pratensis*, D.
Earth nut, 209. Bunium bulbocastanum, F.
Mulberry tree, 1429. H. Morus *nigra*, f.
21. Nightshade, 265. Atropa *Belladonna*, f.
Rye, 288. Secale *hybernum*, *in ear.*
23. Pellitory *of the wall*, 158. 1. Parietaria *officinalis*, F.
24. Bramble, 467. Rubus *fruticosus*, f.

May.

25. Moneywort, 283. 1. Lysimachia *Nummularia*, F.
Columbines, 173. 1. Aquilegia *vulgaris*, F. *in the woods.*

26. Tansy, *wild*, 256. 5. Potentilla *anserina*, F.
Henbane, 274. Hyoscyamus *niger*, F.

27. Campion, *white*, 339. 8. Lychnis *dioica*, F.
Clover, 328. 6. Trifolium *pratense*, F.

28. Avens, 262. 1. Geum *urbanum*, F.
Chervil, *wild*, 207. Chærophyllum *temulentum*, F.

30. Bryony, *black*, 262. 1. Tamus *communis*, F.
Brooklime, 280. 8. Veronica *Beccabunga*, F.
* Cuckowflower, 338. Lychnis *flos cuculi*, F.
Cresses, *water*, 300. 1. Sisymbrium *nasturtium*, F.
Thermom. 32. *Highest this month.*

31. Spurrey, 351. 7. Spergula *arvensis*, F.
Alder, *berry bearing*, 465. Rhamnus *frangula*, F.

VI. MONTH.

Now the mower whets his scythe,
And every shepherd tells his tale
Under the hawthorn in the dale. MILTON.

June 2. Elder, *water*, 460. 1. Viburnum *Opulus*, F.

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* Lychnis flos cuculi is called Meadow Pink in the Swedish Calendar, p. 431. and Cardamine pratensis is called Cuckow flower in that Calendar, p. 428.

June.

2. Lily, *yellow water*, 368. 1. Nymphæa *lutea*, F.

Flower de luce, *yellow water*, 374. Iris *pseudoacorus*, F.

Mayweed, *stinking*, 185. 3. Anthemis *Cotula*, F.

Pimpernel, 282. 1. Anagallis *arvensis*, F.

3. Arsmart, 145. 4. Polygonum *Persicaria*, F.

* Thyme, 430. 1. Thymus *serpyllum*, F.

Parsnep, *cow*, 205. Heracleum *sphondylium*, F.

Quicken tree, 452. Sorbus *Aucuparia*, D.

5. Radish, *horse*, 301. 1. Cochlearia *Armoracea*, F.

Thorn, *evergreen*, 1459. 3. H. Mespilus *Pyracantha*, F.

Bramble, 467. Rubus *fruticosus*, F.

† GOAT SUCKER, or FERN OWL, 27. Caprimulgus *europæus*, *is heard in the evening.*

6. Vine, 1613. H. Vitis *vinifera*. b.

Flixweed, 298. 3. Sisymbrium *Sophia*, F.

Rasberry bush, 467. 4. Rubus *idæus*, F.

Mallow, *dwarf*, 251. 2. Malva *rotundifolia*, F.

Elder, 461. 1. Sambucus *nigra*, F.

Stitchwort, *lesser*, 346. Stellaria *graminea*, F.

Tare, *everlasting*, 320. 3. Lathyrus *pratensis*, F.

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* Pliny, lib. 11. § 14. says, the chief time for bees to make honey is about the solstice, when the vine and thyme are in blow. According to his account therefore these plants are as forward in England as in Italy.

† This bird is said by Catesby, as quoted by the author of the treatise De Migrationibus Avium, to be a bird of passage.

June.

6. Gout *weed*, 208. 3. Ægopodium *podagraria*, F.
Bryony, *white*, 261. 1, 2. Bryonia *alba*, F.
Rose, *dog*, 454. 1. Rosa *canina*, F.
Bugloss, *viper's*, 227, 1. Echium *vulgare*, F.
7. Grass, *vernal*, 398. 1. Anthoxanthum *odoratum*, F.
Darnel, *red*, 395. Lolium *perenne*, F.
Poppy, *wild*, 308. 1. Papaver *somniferum*, F.
Buckwheat, 181. H. Polygonum *Fagopyrum*, F.
8. Pondweed, *narrow leaved*, 145. 9. Polygonum *amphibium*, F.
Sanicle, 221. 1. Sanicula *europæa*, F.
9. Eyebright, *284. 1. Euphrasia *officinalis*, F.
Heath, *fine leaved*, 471. 3. Erica *cinerea*, F.
Saxifrage, *bugle*, *hyacinth*, D.
Broom, 474. 1. Spartium *scoparium*, *podded*.
Nettle, *hedge*, 237. Stachys *sylvatica*, F.
12. Wheat, 386. 1. Triticum *hybernum*, *in ear*.
Meadow-sweet, 259. 1. Spiræa *Ulmaria*, f.
Scabious, *field*, 191. 1. Scabiosa *arvensis*, F.
Valerian, *great water*, 200. 1. Valeriana *officinalis*, f.
Cinquefoil, *marsh*, 256. 1. Comarum *palustre*, F.
Orchis, *lesser butterfly*, 380. 18. Orchis *bifolia*, F.
13. Willow herb, *great hairy*, 311. 2. Epilobium *hirsutum*, F.
Parsnep, *cow*, 205. Heracleum *Sphondylium*.
Betony, *water*, 283. 1. Scrophularia *aquat*. F.

June.

13. Cockle, 338. 3. Agrostemma *Githago*, F.
Sage, 510. 7. H. Salvia *officinalis*, F.

15. Mallow, 251. 1. Malva *sylvestris*, F.
Nipplewort, 173. 1. Lapsana *communis*, F.
Woodbind, 458. 1, 2. Lonicera *Periclymenum*, f.
NIGHTINGALE *sings*.

16. Fir, *Weymouth*, 8. dend. Pinus *Tæda*, F.
Hemlock, 215. 1. Conium *maculatum*, F.
Nightshade, *woody*, 265. Solanum *Dulcamara*, F.
Archangel, *white*, 240. Lamium *album*, F.

17. Vervain, 236. Verbena *officinalis*, F.
Agrimony, 202. Agrimonia *Eupatoria*, F.
Hemlock, *water*, 215. Phellandrium *aquaticum*, F.
Acacia, 1719. H. Robinia *Pseudo-acacia*, F.

18. Yarrow, 183. Achillea *Millefolium*, F.

19. *Thermom.* 44.25. *Highest this month.*

21. Orache, *wild*, 154. 1. Chenopodium *album*, F.
Solstice. About this time ROOKS *come not to their nest trees at night.*
Wheat, 386. 1. Triticum *hybernum*, F.
Rye, 388. 1. Secale *hybernum*, F.
Self-heal, 238. Prunella *vulgaris*, f.
Parsley, *hedge*, 219. 4. Tordylium *Anthriscus*, f.
Grasses of many kinds, as festuca, aira, agrostis, phleum, cynosurus, in ear.

22. Horehound, *base*, 239. Stachys *germanica*, F.
St. John's wort, 342. Hypericum *perforatum*, F.

June.

22. Parsnep, 206. 1. Pastinaca *sativa*, F.
Mullein, *white*, 287. Verbascum *Thapsus*, F.
Poppy, *wild*. 308. Papaver *somniferum*, F.

23. Larkspur, 708. 3. H. Delphinium *Ajacis*, F.
Marygold, *corn*, 182. 1. Chrysanthemum *segetum*, F.

24. Rosemary, 515. H. Rosmarinus *officinalis*, D.

25. Vine, 1613. H. Vitis *vinifera*, F.
Bindweed, *great*, 275. 2. Convolvulus *arvensis*, F.
Feverfew, 187. Matricaria *Parthenium*, F.
Woad, *wild*, 366. 2. Reseda *luteola*, F.
Rocket, *base*, 366. 1. Reseda *lutea*, F.
Archangel, *yellow*, 240. 5. Galeopsis *Galeobdolon*, F.
Wheat, 386. 1. Triticum *hybernum*, F.
Thermom. 20. *The lowest this month.*

27. *Clover mowed.*
Pennywort, *marsh*. 222. Hydrocotyle *vulgaris*, F.
Meadow-sweet, 259. Spiræa *Ulmaria*, F.

28. Oats *manured*, 389. Avena *sativa*, F.
Barley, 388. Hordeum *vulgare*, F.
Midsummer shoots of apricot, oak, beech, elm.
Succory, wild, 172. 1. Cichorium *Intybus*, F.
Blue bottles, 198. Centaurea *Cyanus*, F.
Knapweed, *great*, 198. Centaurea *Scabiosa*, F.

30. *Currants ripe* *.

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* According to Dr. Hales, May and June heat is, at a medium, 28.5.

June.

* The groves, the fields, the meadows, now no more
With melody resound. 'Tis silence all,
As if the lovely songsters, overwhelm'd
By bounteous Nature's plenty, lay intranc'd
In drowsy lethargy.

VII. MONTH.

Berries and pulpous fruits of various kinds,
The promise of the blooming spring, now yield
Their rich and wholesome juices, meant t'allay
The ferment of the bilious blood.

July 2. Beech, 439. Fagus *sylvatica*, F.
Pearlwort, 345. 2. Sagina *procumbens*, F.
Carrot, *wild*, 218. Daucus *Carota*, F.
Grass, *dog*, 390. 1. Triticum *repens* †, *in ear*.
Violet, *Calathian*, 274. Gentiana *Pneumonanthe*, F.
4. Silverweed, 256. 5. Potentilla *anserina*, F.
Betony, 238. 1. Betonica *officinalis*, F.
Nightshade, *enchanters*, 289. Circæa *lutetiana*, f.

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* I heard no birds after the end of this month, except the Stone Curlew, 108.4. Charadrius Oedienemus, whistling late at night; the Yellow Hammer, 93. 2. Emberiza flava; the Goldfinch, 89. 1, and Golden Crested Wren, 79. 9. Motacilla regulus, now and then chirping. I omitted to note down when the Cuckow left off singing, but, as well as I remember, it was about this time. Aristotle says, that this bird disappears about the rising of the dog star, i.e. towards the latter end of July.

† Called in the Table Common Wheat grass, p. 274.

July.

6. Lavender, 512. Lavendula *spica*, F.
Parsley, *hedge*, Tordylium *Anthriscus*, F.
Gromill, 228. 1. Lithospermum *officinale*, F.
Furze, 473. Ulex *genista*, D.
Cow wheat, *eyebright*, 284. 2. Euphrasia *odontites*, F.

7. Pinks, maiden, 335. 1. Dianthus *deltoides*, F.

8. Tansey, 188. 1. Tanacetum *vulgare*, f.
Bed-straw, *lady's yellow*, 224. Galium *verum*, F.
Sage, *wood*, 245. Teucrium *Scorodonia*, F.
Spinach, 162. H. Spinacia *oleracia*, F.
Thermom. 22. *Lowest this month.*

9. Angelica, *wild*, 208. 2. Angelica *sylvestris*, F.
Strawberries ripe.
Fennel, 217. Anethum *Fœniculum*, F.

10. Beans, *kidney*, 884. H. Phaseolus *vulgaris*, *podded.*
Parsley, 884. H. Apium *Petroselinum*, F.
Sun dew, *round leaved*, 356. 3. Drosera *rotundifolia*, F.
Sun dew, *long-leaved*, 356. 4. Drosera *longifolia*, F.
Lily, *white*, 1109. H. Lilium *candidum*, f.

11. Mullein, *hoary*, 238. Verbascum *phlomoides*, F.
Plantain, *great*, 314. 1, 2. Plantago *major*, F.
WILLOW, SPIKED, of Theophrastus. 1699. H. Spiræa *salicifolia*, F.
Jessamine, 1599. H. Jasminum *officinale*, F.
Rest harrow, 332. Ononis *spinosa*, F.
Hyssop, 516. H. Hyssopus *officinalis*, F.

July.

11. Potatoes, 615. 14. H. Solanum *tuberosum*, F.
Second shoots of the maple.
Bell flower, *round leaved*, 277. 5. Campanula, F.
Lily, *white*, 1109. H. Lilium *candidum*, F.
Rasberries ripe.
Figs yellow.

13. Lime tree, 473. Tilia *europæa*, F.
Knapweed, 198. 2. Centaurea *Jacea*, F.
Stonecrop, 269. Sedum *rupestre*, F.
Grass, *knot*, 146. Polygonum *aviculare*, F.
Grass, *bearded dog*, 390. 2. Triticum *caninum* *, F.

15. *Thermom.* 39. *Highest this month.*

16. Asparagus, 267. 1. Asparagus *officinalis*, *berries.*
Mugwort, 190. 1. Artemisia *vulgaris*, F.

18. Willow herb, *purple spiked*, 367. 1. Lythrum *Salicaria*, F.
YOUNG PARTRIDGES.
Agrimony, *water hemp*, 187. 1. Bidens *tripartita*, F.

20. Flax, *purging*, 362. 6. Linum *catharticum*, F.
Arsmart, *spotted*, 145. 4. Polygonum *Persicaria*, F.
Lily, *martagon*, 1112. H. Lilium *Martagon.*

20. HENS *moult.*

22. Orpine, 269. Sedum *Telephium*, f.
Hart's tongue, 116. Asplenium *Scolopendra*, F.
Pennyroyal, 235. Mentha *Pulegium*, F.

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* In the Table, Bearded Wheat Grass, p. 274.

July.

22. Bramble, 461. 1. Rubus *fruticosus*. *Fruit red.*
Laurustinus, 1690. H. Viburnum *Tinus*, f.
24. Elecampane, 176. Inula *Helenium*, F.
Amaranth, 202. H. Amaranthus *caudatus*, F.
27. Bindweed, *great*, 275. 1. Convolvulus *sepium*, F.
28. Plantain, *great water*, 257. 1. Alisma *Plantago*, F.
Mint, *water*, 233. 6. Mentha *aquatica*, F.
Willow herb, 311. 6. Epilobium *palustre*, F.
Thistle tree sow, 163. 7. Sonchus *arvensis*, F.
Burdock, 197. 2. Arctium *Lappa*, f.
Saxifrage, *burnet*, 213. 1, 2. Pimpinella *Saxifraga*, F.
Devil's Bit, 191. 3. Scabiosa *Succisa*, F.
31. Nightshade, common, 288. 4. Solanum *nigrum*, F.
DOVE, RING, 62. 9. Columba *palumbus*, *cooes*.

VIII. MONTH.

Pour'd from the villages, a numerous train
Now spreads o'er all the fields. In form'd array
The reapers move, nor shrink for heat or toil,
By emulation urg'd. Others dispers'd,
Or bind in sheaves, or load or guide the wain
That tinkles as it passes. Far behind,
Old age and infancy with careful hand
Pick up each straggling ear, &c.

August.

1. Melilot, 331. 1. Trifolium *officinale*, F.
Rue, 874. 1. Ruta *graveolens*, F.
Soapwort, 339. 6. Saponaria *officinalis*, F.
Bedstraw, *white*, *lady's*, 224. 2. Galium *palustre*, F.
Parsnep, *water*, 300. Sisymbrium *Nasturtium*, F.
Oats almost fit to cut.

3. *Barley cut.*

5. Tansey, 188. 1. Tanacetum *vulgare*, F.
Onion, 1115. H. Allium *Cepa*, F.

7. Horehound, 239. Marrubium *vulgare*, F.
Mint, *water*, 233. 6. Mentha *aquatica*, F.
Nettle, 139. Urtica *dioica*, F.
Orpine, 269. 1. Sedum *Telephium*, F.
NUTHATCH, 47. Sitta *europæa*, *chatters*.

8. *Thermom.* 20. *Lowest to the 27th of this month.*

9. Mint, *red*, 232. 5. Mentha *gentilis*, F.
Wormwood, 188. 1. Artemisia *Absinthium*. F.

12. Horehound, *water*, 236. 1. Lycopus *europæus*, F.
Thistle, *lady's*, 195. 12. Carduus *marianus*, F.
Burdock, 196. Arctium *Lappa*, F.
ROOKS *come to the nest trees in the evening, but do not roost there.*

14. Clary, *wild*, 237. 1. Salvia *verbenaca*, F.
STONE CURLEW, 108. Charadrius *oedicnemus whistles at night.*

August.

15. Mallow, *vervain*, 252. Malva *Alcea*, F.
GOAT SUCKER, 26. 1. Caprimulgus *europæus*, *makes a noise in the evening, and young owls.*

16. * *Thermom.* 35. *The highest to the 27th of this month.*

17. Orach, *wild*, 154. 1. Chenopodium *album*.
ROOKS *roost on their nest-trees.*
GOAT SUCKER, *no longer heard.*

21. *Peas and wheat cut.*
Devil's bit, *yellow*, 164. 1. Leontodon *autumnale*, F.

26. ROBIN RED BREAST, 78. 3. Motacilla *Rubecula*, *sings.*
Goule, 443. Myrica *Gale*, F. R.
Golden rod, *marsh*, 176. 2. Senecio *paludosus*, F.

29. Smallage, 214. Apium *graveolens*, F.
Teasel, 192. 2. Dipsacus *fullonum*, F.
Vipers come out of their holes still.

IX. MONTH.

How sweetly Nature strikes the ravish'd eye
Through the fine veil with which she oft conceals
Her charms in part, as conscious of decay!

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* From the 27th of this month to the 10th of September I was from home, and therefore cannot be sure that I saw the first blow of the plants during that interval.

September.

2. Willow Herb, *yellow*, 282. 1. Lysimachia *vulgaris*, F.

Traveller's joy, 258. Clematis *Vitalba*, F.

5. Grass of Parnassus, 355. Parnassia *palustris*.

10. *Catkins of the hasel formed.*

Thermom. 17. *The lowest from the* 10*th to the end of this month.*

11. *Catkins of the birch formed.*

Leaves of the Scotch fir fall.

Bramble still in blow, though some of the fruit has been ripe some time; so that there are green, red, and black berries on the same individual plant at the same time.

Ivy, 459. Hedera *Helix*, f.

14. *Leaves of the sycamore, birch, lime, mountain ash, elm, begin to change.*

16. Furze, 475. Ulex *europæus*, F.

Catkins of the alder formed.

Thermom. 36. 75. *The highest from the* 10*th to the end of this month.*

CHAFFINCH, 88. Fringilla *cælebs*, *chirps.*

17. *Herrings.*

20. Fern, female, 124. 1. Pteris *aquilina*, *turned brown.*

Ash, *mountain*, 452. 2. Sorbus *aucuparia*, F. R.

Laurel, 1549. H. Prunus *Laurocerasus*, f. r.

Hops, Humulus *Lupulus*, 137. 1. f. r.

21. SWALLOWS *gone.* *Full moon.*

September.

23. * *Autumnal æquinox.*

25. **Wood lark**, 69. 2. Alauda *arborea, sings.*
Fieldfare, 64. 3. Turdus *pilaris, appears.*
Leaves of the plane tree, tawny — of the hasel, yellow — of the oak, yellowish green — of the sycomore, dirty brown — of the maple, pale yellow — of the ash, fine lemon — of the elm, orange — of the hawthorn, tawny yellow — of the cherry, red — of the hornbeam, bright yellow — of the willow, still hoary.

27. **Black bird** *sings.*

29. **Thrush**, 64. 2. Turdus *musicus, sings.*

30. Bramble, 467. 1. Rubus *fruticosus*, F.

X. MONTH.

Arise, ye winds, 'tis now your time to blow,
And aid the work of Nature. On your wings
The pregnant seeds convey'd shall plant a race
Far from their native soil.

October

1. Bryony, *black*, 262. Tamus *communis*, F. R.
Elder, *marsh*, 460. 1. Viburnum *Opulus*, F. R.
Elder, 461. 1. Sambucus *nigra*, F. R.
Briar, 454. 1. Rosa *canina*, F. R.
Alder, *black*, 465. Rhamnus *Frangula*, F. R.

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* **Autumnal heat, according to Dr. Hales, at a medium, is 18. 25**

October.

1. Holly, 466. Ilex *Aquifolium*, F. R.
Barberry, 465. Berberis *vulgaris*, F. R.
Nightshade, *woody*, 265. Solanum *Dulcamara*, F. R.

2. Thorn, *black*, 462. 1. Prunus *spinosa*, F. R.
* CROW, ROYSTON, 39. 4. Corvus *cornix*, *returns*.

5. *Catkins of sallows formed.*

6. *Leaves of asp almost all off—of chesnut, yellow—of birch, gold-coloured.*
Thermom. 26. 50. *Highest this month.*

7. BLACK BIRD, 65. 1. Turdus *merula*, *sings*.
Wind high; rooks sport and dash about as in play, and repair their nests.

9. Spindle tree, 468. 1. Euonymus *europæus*, F. R.
Some ash trees quite stripped of their leaves.
Leaves of marsh elder of a beautiful red, or rather pink colour.

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* Linnæus observes in the Systema Naturæ, and the Fauna Suecica, that this bird is useful to the husbandman, though ill treated by him. In a note to the Treatise on the Use of Curiosity, Mr. Stillingfleet makes a similar remark on the utility of the rook, which, like the crow, is often driven away by the farmer. "Thus in Suffolk and some parts of Norfolk, the farmers find it their interest to encourage the breed of rooks, as the only means to free their grounds from the grub, from which the Tree or Blind Beetle comes (vide Lister's Gaedert p. 265. pl. 3. Scarabæus Melolontha S. N. 10. p. 351.) which in its grub state destroys the roots of corn and grass to such a degree, that I myself have seen a piece of pasture land, where you might turn up the turf with your foot.

"Mr. Matthews, a very observing and excellent farmer, of Wargrove in Berkshire, told me that the rooks one year, while his men

October.

10. **Wood lark** *sings.*

* **Ring dove** *cooes.*

14. **Wood lark** *sings.*

Several plants still in flower, as pansy, white behn, black nonesuch, hawkweed, bugloss, gentian, small stitchwort, &c. in grounds not broken up.

A great mist and perfect calm; not so much as a leaf falls. Spiders' webs innumerable appear every where. Woodlark sings. Rooks do not stir but sit quietly on their nest trees.

16. **Geese, wild,** 136. 4. Anas, *Anser, leave the fens and go to the rye lands.*

22. **Woodcock,** 104. Scolopax *rusticola, returns.*

Some ash-trees still green.

24. **Lark, sky,** 69. 1. Alauda *arvensis, sings.*

Privet, 465. 1. Ligustrum *vulgare,* F. R.

26, *Thermom.* 7. *Lowest this month.*

Honeysuckle, 458. 1, 2. *Lonicera Periclymenum still in flower in the hedges, and mallow and feverfew.*

Wild geese *continue going to the rye lands.*

Now from the north
Of Norumbega, and the Samoeïd shore,

---

were houghing in a turnip field, sat down in a part of it where they were not at work, and that the crop was very fine in that part, whereas, in the other part, there were no turnips that year."

* Aristotle says, this bird does not cooe in the winter, unless the weather happens to be mild.

Bursting their brazen dungeons, arm'd with ice,
And snow, and hail, and stormy gust, and flaw,
Boreas, and Cæcias, and Argestes loud,
And Thrascias rend the woods, and seas up-turn.

MILTON.

Here ends the Calendar, being interrupted by my going to London. During the whole time the barometer fluctuated between 29.1. and 29.9. except a few days, when it sunk to 28.6. and rose to 30 ½.

* * *

⁂ It is a matter of regret that the plan of forming Calendars similar to these Floras has not been more frequently adopted. We find, however, in Young's Annals of Agriculture, Vol. VIII. for 1797, a Calendar of Flora for 1785, compiled at Troston in Suffolk, by Capel Loft, Esq. and compared with this of Mr. Stillingfleet. As Stillingfleet's consisted chiefly of plants growing in the fields or groves; Mr. Loft's is almost entirely of garden plants, though many of them indigenous, or naturalised. The latitude and situation of Stratton and Troston are nearly similar.

A SIBERIAN OF LAPLAND YEAR.

June
23. Snow melts.
July 1. Snow gone.
9. Fields quite green.
17. Plants at full growth.
25. Plants in full blow.
August
2. Fruits ripe.
10. Plants shed their seeds.
18. Snow.

From this time to June 23, snow and ice; so that by this account, plants, from the coming out of the ground to the ripening of their seeds, take but a month. And the spring, summer, and autumn, are crouded into the space of fifty-six days. This account is taken from a treatise published in the Amœn. Academ. vol. IV. and agrees with one I have seen quoted out of Gmelin, who was in Siberia many years.

THE

CALENDAR OF FLORA.

BY THEOPHRASTUS.

At Athens, Latitude 37° 25′.

INTRODUCTION

TO THE

GRECIAN CALENDAR OF FLORA.

THE following Calendar was extracted chiefly from Theophrastus's History of plants, and put together in the best manner I was able from imperfect materials. Any one who looks into the original will see that accuracy ought not to be expected; the manner of marking the times being often very indeterminate.

I am sensible that objections may be made to many parts of this Calendar; but I thought it not worth while to give my reasons for what I have done, and thereby load a piece of mere curiosity with pompous quotations.

It has always seemed extraordinary to me, that when disciples of Linnæus have been sent into so many parts of the world, in order to make discoveries in natural history, viz. Asia, Pensylvania, Lapland, Ægypt, Palestine, Malabar, Surat, China, Java, Spain, America, Gothland, Italy, Apulia, Surinam, and St. Eustatia, that Greece should have been overlooked. It is true, Tournefort was sent into the Levant by Lewis the

Fourteenth to search for plants, and spent some years there; it is also as true, that he had all the knowledge and zeal necessary for such a commission; but the country was too extensive for one man to examine thoroughly in that space of time. He rambled over most of the Greek islands, Armenia, and other parts of Asia; and though he enriched the royal gardens with many new plants, yet several must have escaped him for want of time, or a proper season.

It were to be wished therefore, that some persons properly qualified, might be sent to Greece, and be enjoined to make Attica, particularly, their place of residence for a year at least. This might furnish a Flora and Fauna Attica, that would be extremely curious to all lovers of Natural History, and tend to clear up many passages in those authors, who first opened that branch of knowledge, as well as carried some parts of it much farther, than is generally known, or at least acknowledged; and from whose writings much more benefit might still be reaped, were they better understood, especially in the medicinal way.

As the English nation will have the honour of first making known to the world the true and accurate proportions of the antient Greek architecture*; so I hope it is reserved for us to bring the rest of Europe thoroughly acquainted with the nature of the soil, climate, productions, animals, &c. of a country whose antient glory so much resembles our own, and in a great measure has been the cause of it, by furnishing us with the best models of good sense, taste, and just sentiments in every branch of human knowledge. We therefore ought in a particular manner to look upon Attica, from whence as Cicero says, *Humanitas, doctrina, fruges, jura, leges orta, atque in omnes terras distributa putantur,* with the veneration due to a mother country. Should such a scheme take place, I could name a person perfectly well qualified, by his youth and abilities, and zealously inclined, upon proper encouragement, to be one of the party. France, Sweden *, and Russia, have set us examples of this kind, and why this great and flourishing nation should not follow them I cannot see. We have had our share in advancing Natural History, it is true, but hitherto without any public encouragement †.

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* Mr. Stillingfleet here alludes to the celebrated work of Stuart and Revett on the Antiquities of Athens, vol. I. of which was published in 1762, about the time when the second edition of these miscellanies was printed.

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* Amongst many instances of this sort, there is one that deserves particular notice mentioned Amœn. Academ. p. 445. The author says, that Hasselquist was sent into Ægypt at the expence of his countrymen the East Gothlanders, of the heads of the university, and of the East India Company, for the study of Natural History; and staid above a year at Cairo.

† What satisfaction must it have given to the excellent Stillingfleet, had he lived to hear of the travels of Dr. John Sibthorp, the late much lamented Regius Professor of Botany at Oxford; and to see the produce of his learned labours edited by Dr. Smith, the learned President of the Linnæan Society, in that most splendid and elaborate work the Flora Græca.

Dr. Sibthorp left England in 1785, as Dr. Radcliffe's travelling fellow; and having passed through Germany, Italy, and Sicily, he spent two years in Greece and the islands. Returning in 1787, with a prodigious treasure of plants and drawings, he immediately began to work on his intended Flora Græca. Having carefully surveyed whatever he had collected in his travels, and compared his specimens with the Sherardian Herbarium at Oxford, that of Sir Joseph Banks, and that of Linnæus, in the hands of Dr. Smith, he found it necessary, in order to render his work complete, to travel once more to Greece; whence he returned a second time in the year 1795. But, alas! these great exertions proved beyond his natural strength; and he died soon after his return home.

By his will, Dr. Sibthorp ordered the Flora Græca to be published in ten volumes in folio, with one hundred plates in each; and also a prodromus in octavo, without plates. To defray the expence of this splendid work, he bequeathed an estate of near three hundred pounds yearly rent, which is afterwards to found a Professorship of Agriculture in the University of Oxford. The will directed his executors John Hawkins, Esq. (his fellow-traveller), and Thomas Platt, Esq. to look out for a proper person to publish the work. With that judgment which might be expected from such men, they hesitated not to fix upon the President of the Linnæan Society for this arduous task.

Dr. Sibthorp's zeal, assiduity, and perseverance, cannot be too highly praised. He collected, or observed, about six thousand plants in Greece, and the neighbouring islands, during his two journeys. He left a thousand fine drawings, but no names to them, or to his specimens; nor any reference from his journal, or lists to either. All the description, therefore, characters, and decisions concerning synonyms, devolve to the discretion of the learned Editor.

Dr. Sibthorp, however, left many excellent remarks in his journal, and a complete set of annotations on the famous MS. of Dioscorides at Vienna, which have proved of the greatest use in ascertaining the antient Greek synonyms. What he left imperfect was necessarily so, till he could study books and collections at home.

The first volume of this great work, and two parts of the Prodromus, have now been some time before the publick. The former contains one hundred plates, elegantly coloured, with the characters, descriptions, synonyms, Greek names antient and modern, place of growth, and occasional remarks. The latter forms a catalogue of all the plants found by Dr. Sibthorp, with select synonyms, a reference to one good figure, the Greek and Turkish names, the place of growth, &c. but no characters, descriptions, or figures. The first part proceeds to the end of the class Pentandria; the second to Didynamia.

This classical work may truly be denominated fortunate, except in the premature death of the excellent author; for no man could have been selected more able to ascertain the plants of Greece than Sibthorp; or so fit to be the editor of them as Smith; no draughtsman could have been chosen like Bauer; no engraver like Sowerby. In short, the whole execution of the work is deserving of the highest praise, M,

THE

CALENDAR OF FLORA.

BY THEOPHRASTUS.

Feb.

1. — * Violet, *early bulbous*, 1144. H. Leucoium *vernum*, λευκοιον, F.
Wall flower, 291. 2. Cheiranthus *cheiri*, φλογιον, F.
Cornel tree, 1536. H. Cornus, *mas*, κϱανεια, L.
Dogberry, 460. Cornus, *sanguinea*, θηλυκρανεια, L.
14. — Bay tree, 1688. H. Laurus *nobilis*, δαφνη, L.
Alder, 442. Betula *alnus*, κληθρα, L.
Abele, 446. 3. Populus *alba*, λευκη, L.
Elm, 468. Ulmus *campestris*, ϖτελεα, L.
Sallow, *Salix*, ιτεα, L.
Poplar, *black*, 446. 1. Populus *nigra*, αιγειρος, L.
Plane tree, 1706. H. Platanus *orientalis*, ϖλατανος, L.

March

12. — † Beginning of SPRING.
Fig tree, 1431. H. Ficus *carica*, ερινεος, L.

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* This mark — after some of the figures, denotes that the time is only determined within certain limits.

All the other marks mean the same as in my own Calendar.

† Between February 28 and March 12, the Ornithian winds blow, and Swallow appears.

March.
12. — Alaternus, 1608. 1. Rhamnus *alaternus*, φιλυκη, L.
Hawthorn, 453. 3. Cratægus *oxyacanth.* οξυακανθος, L.
Christ's thorn, 1708. H. Rhamnus *paliurus*, παλιουρος, L.
Turpentine tree, 1577. H. Pistacia *terebin.* τερμινθος, L.
Chesnut-tree, 1382. H. Fagus *castanea*, διος βαλανος, L.
Walnut-tree, 1376. H. Juglans *regia*, καρυα*, L.
Lily of the valley, 264. Convallaria *Maialis*, οινανθη, F.
Narcissus, C. B. 49, ανεμωνη λειμωνια, F.
Daffodil, 1131. H. Narcissus *pseudo-narcissus* †, βυλϐοκωδιον, F.
Corn flag, 1169. 2. H. Gladiolus *communis*, F.
Hyacinth, 1162. 31. Hyacinthus *comosus*, υακινθος, F.
Rose, rosa, ροδον, F.
20. — ‡ Elder tree, 461. 1. Sambucus *nigra*, ακτη, L.
Fleawort, 881. H. Plantago *psyllium*, κυνοψ, F.
Oak, 442. Quercus, robur, δρυς, L.
Fig-tree, 1431. H. Ficus *carica*, συκη, L.
Oak, 1386. H. Quercus *esculus*, φηγος, L.
Lime-tree, 473. Tilia *Europæa*, φιλυρα, L.
Maple, 470. 2. Acer *campestris*, ζυγια, L.
Apple-tree, 451. Pyrus *malus*, μηλεα, L.

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* Καρυα is always attended with a description, and appears to indicate a nut-bearing tree. K. Ευϐοϊκη. K. βασιλικη. K. Περσικη, all denote the *wallnut*, and illustrate its history. Καρυα Ηρακλεωτικη, Nux *avellana*, the *hazel-nut*, of which Theophrastus reckons two sorts, K. αγρια and K. ημερος. Corylus, *avellana*, the *common* nut. Corylus *colurna*, the *filberd*. (S.)

† Narcissus Bulbocodium, L. Sp. Pl. 417. (S.)

‡ Between March 11 and 26, the Kite and Nightingale appear, that is, in the leafing season. The appearance of the Hawk is consonant to what Aristotle says, as quoted in the Preface, but is determined upon a different kind of testimony; which is a proof that this part of the Calendar at least is tolerably well stated.

March
20. — Ivy, 459. Hedera *helix*, κιττος, L.
Beam tree, *white*, 453. Cratægus *aria*, αρια, L.
26. — Tree of Life, 1403. H. Thuia *occidentalis*, θυια, L.
April
4. — Succory, 172. Cichorium *intybus*, κιχοριον, F.

May 12. Beginning of SUMMER.
15. — *Wheat harvest.*
Turpentine-tree, 1557. H. Pistacia, *terebinthus*, τερμινθος, F. R.
Flower of Constantinople, 992. 1. H. Lychnis *Chalcedonica*, λυχνις, F.
Rose campion, 993. 2. H. Lychnis *coronaria*, [Agrostemma coronaria, L.], διος ανθος, F.
Asphodel, *yellow*, 1192. 4. H. Asphodelus *luteus*, ασφοδελος, F.
Ash-tree *, 468. Fraxinus *excelsior*, μελια, F. R.
Maple, 470. 2. Acer *pseudo-platanus*, σφενδαμνος, F. R.
Pine, 1398. H. Pinus † *sylvestris*, πιτυς, F.

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* Dr. Smith has shewn, from the papers of Dr. Sibthorp, that the μελια of Theophrastus is the Fraxinus *Ornus*, or Manna Ash, (Flora Græca, tab. 4), and not F. *excelsior*, or Common Ash, which is not known in Greece; and that the πευκη is probably the Pinus *maritima*.

† Πιτυς, Pinus *sylvestris*.
Πευκη αγρια, 1 Genus. Π. Ιδαια, Pinus *pinaster*.
2 Genus. Π. Παραλιας, Pinus *maritima*.
Two wild sorts.
Πευκη ημερα, Pinus *pinea*, Stone Pine.
Πευκης τι γενος, Pinus *larix*.
Π. ελατη, 1. Αρρην. Pinus *abies*, Spruce Fir.
2. Θηλεια. Pinus *picea*, Silver Fir.

Theophrastus, contrary to his usual custom, is very diffusive in his description of the Pine and Fir trees. (S.)

May

15. — Fir-tree, *common*, 1396. Pinus *abies* πευκη, F.

June

20. — * Fir-tree, *yew-leaved*, 1394. Pinus *picea*, ελατη, F.

Yew-tree, 445. Taxus *baccata*, μιλος, F. R.

Cornel-tree, 1536. H. Cornus *mas*, κρανια, F. R.

Midsummer shoots of the oak.

The fig, the vine, and the pomegranate, shoot later.

July

23. — *Cuckow disappears.*

30. — *Etesian winds blow.*

August

19. —

Beginning of AUTUMN.

Lily, Lilium, λειριον, F.

Crocus, 1173. 3. Crocus *autumnal*, κροκος, F.

Dogberry, 460. Cornus *sanguinea*, θηλυκρανια, F. R.

Alder, 442. Betula *alnus*, κληθρα, F. R.

Quail, 58. 6. Tetrao, *coturnix*, ορτυξ, *departs.*

September

20. — Crane, 95. Ardea, *grus*, γερανος, *departs.*

Autumn shoots of trees.

October

12. — Oak, 440. Quercus, *robur*, δρυς, F. R.

Chesnut, 1382. H. Fagus *castanea*, διος βαλανος, F.R.

Christ's thorn, 1708. H. Rhamnus *paliur*. παλιουρος, F.R.

Hawthorn, 453. 3. Cratægus *oxyacantha*, οξυακανθος, F. R.

Holm oak, 1391. H. Quercus *coccifer*, πρινος, F. R.

Alaternus, 1608. 1. H. Rhamnus *alatern*. φιλυρη, F. R.

October
29. — Venice sumach, 1696. H. Rhus *cotinus*, κοκκυγρια, F.
Apple-tree, 451. Pyrus *malus*, μηλεα, F. R.
Beam-tree, *white*, 453. Cratægus *aria*, αρια, F. R.
Lime-tree, 473. Tilia *Europæa*, φιλυρη, F. R.
Box-tree, 445. Buxus *sempervivens*, πυξος, F. R.

Beginning of WINTER.

November
15. — Ivy, 459. Hedera *helix*, κιττος, F. R.
Juniper, 444. H. Juniperus *communis*, αρκευθος, F. R.
Tree of Life, 1408, H. Thuia *occident.* θυια, F. R.
Yew-tree, 445. Taxus *baccata*, μιλος, F. R.
Pear-tree, 1450. Pyrus *communis*, αχρας, F. R.
Arbutus, 1577. 2. H. ανδραχνη, F. R.

ADDITIONS TO THE

CALENDAR OF FLORA,

BY PROFESSOR MARTYN.

CONTAINING

General Observations on the Leafing and Flowering of certain Plants, during a series of years:

TIMES OF LEAVES.

	Foliation.	Defoliation.
Acer Pseudoplatanus. *Great Maple,* vulgarly *Sycamore. Plane,* Scotl.	Apr. 9, 12, 13.	Bare, Nov. 10, 1792.
Acer Campestre. *Common Maple,*	Apr. 18, 19.	Yellow, Nov. 1, and bare Dec. 10, 1792. Yellow and falling Oct. 14, 1793. Nov. 1, 1804.
Æsculus Hippocastanum, *Horse Chesnut,*	Apr. 12 to May 11.	Oct. 17, 1792. Oct. 14, 1793. Oct. 27, 1804.
Cratægus s. Mespilus Oxyacantha, *Hawthorn,* or *Whitethorn.*	Apr. 10, 12. Apr. 7, 1784. Mar. 22, 1794.	Oct. 10, 1793, begins to fall. Some almost naked, Nov. 1, 1804.
Fagus Castanea, *Sweet Chesnut,*	Apr. 16, 21.	Oct. 12, 1792, turns yellow.
Fagus sylvatica, *Beech,*	Apr. 29,	Rusty, Nov. 1. Coppices almost naked, Nov. 6, 1792.
Fraxinus excelsior, *Ash,*	Apr. 22 to May 15.	Bare, Nov. 20, 1792. Some trees turned very yellow, Oct. 10, 1793. Old ones naked, Oct. 27, 1804.
Juglans regia, *Walnut,*	Apr. 21 to May 14.	Falling, Oct. 27, 1804.
Morus nigra, *Mulberry,*	May 20. Budding Apr. 24, 1794.	Oct. 17, 1792. Nov. 28, 1799, quite bare. Falling, Nov. 7, 1804.
Pinus Larix, *Larch,*	April 8.	Bare, Dec. 10, 1792.
Platanus occidentalis, *Occidental Plane.*	April 21.	Oct. 14, to 27.
Populus nigra, *Black Poplar,*	Apr. 21, 22.	Bare, Nov. 20, 1792.
Populus alba, *White Poplar,*	Apr. 10, 16.	Bare, Dec. 10, 1792.
Populus Italica, *Lombardy Poplar,*	May 8, 7.	Falling, October 14, 1793. Almost naked, Oct. 27, 1804.
Pyrus communis, *Pear,*	Apr. 6.	Falling, Oct. 27. Almost bare, Nov. 1, 1804.
Pyrus Malus, *Apple,*	Apr. 14.	Falling, October 10, 1793.

	Foliation.	Defoliation.
Quercus Robur, *Oak*,	May 6.	Oct. 22, to Nov. 16.
Ribes Uvacrispa, *Gooseberry*,	Feb. 13, 1783. Mar. 13, 1784.	
Rosa rubiginosa, *Sweet Briar*,	Feb. 21, 1783.	
Rubus fruticosus, *Bramble*,	Feb. 21, 1783, budding.	
Salix babylonica, *Weeping Willow*,	Apr. 8.	Dec. 11, 1792, leaves falling.
Sambucus nigra, *Elder*,	Feb. 21, 1783.	
Tilia europæa, *Lime*,	Apr. 18, to May 12.	Nov. 6, 1786, bare.
Ulmus campestris, *Elm*,	Apr. 10.	Quite bare, Nov. 3, 1788, in St. James's Park. Ditto Nov. 10, 1792.

General Remarks.

1786. Nov. 4. Oaks in full leaf, whilst Beeches have lost their foliage.

Nov. 16. All leaves fallen, except from Oaks, whose foliage is of the Midsummer shoot.

1787. Nov. 14. The Planes by the Ranger's house in the Green Park have many green leaves; whereas, on Nov. 6, leaves were entirely fallen in the country, except from elms.

1788. Oct. 22. The foliage continued unusually fresh to this day; when the leaves begin to fall in showers, in consequence of frost. Some Oaks are still green in the woods.

1792. Leaves begin to fall on Aug. 16, and were mostly fallen Oct. 18. Beeches began to change colour Sept. 3, the tinge was much deepened Oct. 4, and the trees were bare Nov. 10.

Many Lime trees about London were bare on Sept. 12; whilst, on Sept. 28, Limes 50 miles S.W. of London; whose roots penetrated into the fissures of the rocks, had their foliage unchanged.

Sept. 14. Many introduced trees, as Italian Poplars, Planes, Tulip-trees, and also the esculent Chesnut, were in full verdure, while most of our native Trees were much faded.

Nov. 27. The Elm was the only tree which retained any leaves; but they were mostly gone by the 10th of December.

1794. The Spring was remarkably forward, and vegetation exuberant. Whitethorn was in leaf, and Blackthorn in bloom, about Cambridge March the 22nd.

April 18. Green Gooseberries were brought to market.

April 22. Whitethorn was in full flower

A Comparative View of the Leafing and Flowering of certain Trees, Shrubs, and Plants, during the Spring of the years 1808 *and* 1809.

These two seasons were very different. In the Spring of 1808, a great flight of snow that fell on Feb. 12, was not quite gone till April 6, it being succeeded by dry weather, frost, and cold N.E. winds. On April 6, a heavy rain fell, with a warm S. wind; the thermometer rising from 36° to 51°. From that time to the end of the month cold N. and N.E. winds. May 1, it set in warm, with the thermometer at 51° and 52°; on the 3d, at 59°; on the 4th at 63°, and in the open air at a N.E. exposure, 69°.

In the following Spring, of 1809, the months of February and March were in general mild and wet, with very little frost, and the thermometer within doors from 39° to 51°, bringing trees and plants very forward. The month of April was stormy; on the 18th there was snow and frost; and on the 20th and 21st was a remarkably heavy fall of snow. Towards the end of the month it became warm, and great part of the month of May was hot; the thermometer within doors from 48° to 68°, and on the 18th, 70°; and vegetation advanced at a great rate.

The observations were made 63 miles N. of London, and the thermometer was in a North staircase window.

LEAFING.

	1808.	1809.
Sambucus nigra, *Elder*	Apr. 9.	Feb. 27.
Philadelphus coronarius, *Syringa*	Apr. 26.	Mar. 6.
Syringa, *Lilac*	May 1.	Mar. 12.
Salix babylonica, *Weeping Willow*	May 6.	Mar. 12.
Ribes Uva crispa, *Gooseberry*	Apr. 7.	Mar. 15.
Ribes nigrum, *Black currant*	Apr. 29.	Mar. 15.
Pinus larix, *Larch*	Apr. 30.	Mar. 17.
Berberis vulgaris, *Barberry*	Apr. 26.	Mar. 18.
Cratægus oxyacantha, *White-thorn*	Apr. 30.	Mar. 21.
Rosa canina, *Dog Rose*	Apr. 13.	Mar. 21.
Ribes rubrum, *Red Currant*	Apr. 14.	Mar. 21.
Euonymus europæus, *Spindle-tree*	May 2.	Mar. 23.
Spiræa hypericifolia	May 1.	Mar. 24.
Viburnum lantana, *Wayfaring-tree*	May 2.	Mar. 24.
Pyrus malus, *Apple-tree*	May 4.	Apr. 12.
Sorbus aucuparia, *Mountain Ash*	May 6.	Apr. 15.
Populus balsamifera, *Tacamahaca*	May 6.	Apr. 15.
Æsculus hippocastanum, *Horse Chesnut*	May 3.	Apr. 20.
Pyrus communis, *Pear-tree*	May 4.	Apr. 20.
Corylus avellana, *Hasel-nut*	May 5.	Apr. 22.
Mespilus germanica, *Medlar*	May 6.	Apr. 22.
Acer pseudoplatanus, *Sycamore*	May 6.	Apr. 23.
Prunus cerasus, *Cherry*	May 4.	Apr. 24.
Prunus sativa, *Plum*	May 6.	Apr. 25.
Populus dilatata, *Lombardy Poplar*	May 10.	May 6.
Betula alnus, *Alder*	May 10.	May 7.
Betula alba, *Birch*	May 6.	May 7.
Cratægus aria, *White Beam tree*	May 12.	May 8.
Carpinus betulus, *Hornbeam*	May 10.	May 10.
Cornus sanguinea, *Dogwood*	May 10.	May 10.
Cratægus crus-galli, *Cock's-spur Hawthorn*	May 13.	May 11.
Fagus sylvatica, *Beech*	May 16.	May 11.
Ulmus campestris, *Elm*	May 10.	May 12.
Populus alba, *White Poplar*	May 16.	May 12.
Acer campestre, *Maple*	May 16.	May 12.
Vitis vinifera, *Vine*	May 14.	May 12.
Tilia europæa, *Lime-tree*	May 12.	May 10.
Juglans regia, *Walnut*	May 13.	May 13.
Quercus robur, *Oak*	May 16.	May 15.
Robinia Pseudacacia	May 18.	May 16.
Fraxinus excelsior	May 14.	May 18.

FLOWERING.

	1808.	1809.
Corylus avellana, Female	Feb. 5.	Feb. 1.
——————— Male	Feb. 5.	Feb. 3.
Helleborus hyemalis, *Christmas Rose*	Feb. 5.	Feb. 2.
Galanthus nivalis, *Snowdrop*	Mar. 1.	Feb. 6.
Anemone hepatica	Mar. 1.	Feb. 11.
Crocus vernus	Mar. 4.	Feb. 17.
Taxus baccata, *Yew*, Male,	Apr. 7.	Feb. 18.
Daphne mezereum	Mar. 4.	Feb. 18.
Draba verna, *Whitlow-grass*	Apr. 2.	Feb. 18.
Primula vulgaris, *Primrose*	Feb. 29.	Feb. 23.
Viola odorata, *Sweet Violet*	Apr. 7.	Feb. 23.
Buxus sempervirens, *Box*	Apr. 13.	Mar. 7.
Amygdalus persica, *Peach and Nectarine*	Apr. 7.	Mar. 15.
Prunus armeniaca, *Abricot*	Apr. 7.	Mar. 17.
Ranunculus ficaria, *Pilewort*	Apr. 7.	Mar. 18.
Saxifraga crassifolia	Apr. 17.	Mar. 20.
Narcissus Pseudonarcissus, *Daffodil*	May 2.	Mar. 22.
Amygdalus communis, *Almond*	May 1.	Mar. 25.
Vinca major, *Great Periwinkle*	May 7.	Mar. 25.
Hyacinthus orientalis, *Garden Hyacinth*	Apr. 13.	Mar. 28.
Cheiranthus cheiri, *Wallflower*	Apr. 17.	Mar. 29.
Prunus spinosa, *Blackthorn*	Apr. 30.	Mar. 30.
Ribes rubrum	Apr. 26.	Apr. 8.
Primula officinalis, *Cowslip*	May 2.	Apr. 13.
Prunus cerasus	May 2.	Apr. 15.
Fritillaria meleagris, *Fritillary*	May 4.	Apr. 20.
Glecoma hederacea, *Ground Ivy*	May 2.	Apr. 25,
Gentiana verna, *Gentianella*	May 11.	Apr. 30.
Pulmonaria virginica	May 7.	May 4.
Ribes nigrum	May 10.	May 5.
Scilla nutans, *Hare-bell*	May 13.	May 5.
Veronica chamædrys, *Germander Speedwell*	May 16.	May 6.
Cardamine pratensis, *Ladies-smock*	May 13.	May 8.
Carum carui, *Caraway*	May 17.	May 9.
Tulipa gesneriana, *Tulip*	May 14.	May 9.
Prunus laurocerasus, *Laurel*	May 17.	May 10.
Pyrus malus	May 14.	May 10,
Plantago lanceolata, *Ribwort Plantain*	May 14.	May 10.
Chærophyllum sylvestre, *Cow-weed*	May 16.	May 10.
Viburnum lantana, *Wayfaring-tree*	May 16.	May 11.
Rosmarinus officinalis, *Rosemary*	May 1.	May 12.
Erysimum barbarea, *Winter Cress*	May 18.	May 12.
Spiræa hypericifolia	May 17.	May 12.
Berberis vulgaris	May 23.	May 15.
Syringa, *Lilac*	May 16.	May 15.
Pyrus cydonia, *Quince*	May 17.	May 17.
Alopecurus pratensis, *Fox-tail grass*	May 17.	May 17.

Brimstone and Peacock's-eye Butterflies,	Apr. 13.	Feb. 28.
Cuckoo first heard,	Apr. 30.	May 1.
Swallow first seen,	May 1.	May 5.

FLOWERING.	1775	1776	1782	1783	1784	1791	1799	1800	1801	1802	1803	1804	1805	1806	1807
Aconitum napellus							June30		May 31	June19	May 28	May 21	June12	May 28	June 1
Æsculus hippocastanum						Apr. 21					May 14	May 17		May 20	May 15
Alopecurus pratensis										May 9	May 5	May 14		May 26	May 16
Amygdalus communis											Apr. 11	Apr. 15	Apr. 11	May 6	Apr. 7
Amygdalus persica				Mar.10					Mar.12	Mar.19	Mar.25	Mar.12	Mar.15	Mar.21	
Anemone hepatica							Feb. 27	Feb. 11	Jan. 31	Feb. 4	Mar. 1	Jan. 15	Feb. 13	Feb. 7	Jan. 15
Anemone nemorosa									Apr. 8		Apr. 12	Apr. 5	Apr. 8	Apr. 21	
Calendula hortensis									June21		June13	June18	July 12	June20	June29
Chrysanthemum segetum							July 8		June20					July 12	
Colchicum autumnale									Aug.27				Sep. 24		Sep. 17
Corylus avellana, mas					Mar. 5		Feb. 25	Feb. 22	Jan. 29		Feb. 24	Jan. 27	Feb. 21	Mar. 1	Jan. 16
Corylus avellana, femina				Feb. 17	Mar. 5		Feb. 28	Feb. 18	Feb. 5		Feb. 24		Feb. 21	Feb. 20	Jan. 16
Cratægus oxyacantha	Apr. 30		May 25							May 7	May 5	May 11		May 19	May 16
Crocus vernus					Mar. 6		Mar. 2	Mar.23	Feb. 23	Mar. 1	Mar.14	Feb. 21	Feb. 25	Feb. 24	
Cynoglossum omphalodes							Feb. 27	Mar.29	Feb. 4	Mar.23	Mar.28	Jan. 30	Mar.16	Apr. 5	Apr. 9
Daphne laureola							Mar.24		Apr. 8		Mar.12	Jan. 31	Feb. 26	Feb. 23	Jan. 29
Daphne mezereum				Jan. 30	Mar.12		Mar. 9		Mar. 1	Mar. 1	Mar.18		Feb. 23	Feb. 22	Mar.31
Digitalis purpurea							July 2		June 1	June16	June22	June 9	June22	June 9	June 4
Draba verna				Mar.20					Mar.31				Mar.30	Mar.22	Apr. 9
Fraxinus excelsior									Apr. 4		Apr. 11				
Fritillaria imperialis											Apr. 3	Apr. 15	Apr. 9	Apr. 18	
Galanthus nivalis				Feb. 13	Feb. 23	Jan. 18	Feb. 22	Feb. 23	Jan. 30	Feb. 22	Feb. 21	Jan. 30	Feb. 13	Feb. 22	Jan. 29
Glecoma hederacea									Apr. 3	Apr. 17				Apr. 17	Apr. 24
Helleborus hyemalis							Feb. 23		Jan. 24	Feb. 4	Feb. 17	Jan. 14	Feb. 13	Feb. 20	Jan. 29
Hibiscus syriacus									Aug.30				Sep. 20	Aug.22	Aug.21
Lilium bulbiferum							July 9		June27	July 4	June28	June23	July 12	June26	June26
Lilium candidum							July 27		July 10	July 12	July 11	June30	July 23	July 5	July 11
Mercurialis perennis, mas									Apr. 1	Apr. 2	Mar.28	Apr. 1	Apr. 10	Apr. 7	
Narcissus pseudonarcissus				Mar.12					Mar.26	Mar.25	Mar.25		Mar.22	Apr. 7	

Papa-

FLOWERING.	1775	1776	1782	1783	1784	1791	1799	1800	1801	1802	1803	1804	1805	1806	1807
Papaver offic. plen. hort.	......	......	......	......	......	......	July11	......	June20	June21	June22	June19	July 4	June18	June21
Papaver orientale	......	......	......	......	......	......	June22	......	June21	June10	June 1	May 25	June12	June 6	June20
Primula officinalis	Mar.19	Mar.31	......	......	......	Apr. 2	......	......	Apr. 4	Apr. 16	Mar.24	Apr. 5	Apr. 20	Apr. 10	Apr. 28
Primula veris, *Primrose*	......	Mar.15	......	Feb. 21	......	......	......	Mar.24	Mar. 4	......	Feb. 25	Feb. 29	Mar. 4	Mar. 1	
Prunus armeniaca	Feb. 25	Mar.18	......	Feb. 21	......	......	......	......	......	......	Mar.26	Mar.13	Mar.14	Mar. 3	
Prunus cerasus, *May Duke*	......	......	......	......	......	......	......	......	Apr. 9	Apr. 8	Apr. 2	......	Apr. 12	Apr. 29	Apr. 27
Prunus insititia	......	......	......	......	......	......	......	......	Apr. 2	Apr. 12	Apr. 12	Apr. 5	Apr. 11	Apr. 21	Apr. 23
Prunus spinosa	......	......	......	......	......	......	......	......	Apr. 1	Apr. 8	Apr. 11	Apr. 16	Apr. 18	Apr. 25	Apr. 28
Pyrus communis, *Pear*	......	......	......	......	......	......	......	......	Apr. 9	Apr. 23	Apr. 16	Apr. 11	Apr. 11	Apr. 17	Apr. 30
Pyrus malus, *Apple*	......	......	......	Mar.21	......	......	......	......	......	Apr. 24	......	May 2	Apr. 30	May 9	May 5
Ranunculus ficaria	Mar.14	Mar.11	......	......	......	......	......	Feb. 11	Mar. 2	Mar.25	Mar.17	Mar.12	Mar.30	Mar.24	Mar.31
Viola martia	......	Mar.15	......	Mar. 8	......	......	......	Apr. 6	Mar. 1	Mar.18	Mar.23	Jan. 31	Mar.17	Mar. 3	Apr. 8

	1799	1800	1801	1802	1803	1804	1805	1806	1807
Ribes rubrum	....	....	....	April 14	April 11	....	April 10	April 28	April 29
Ribes uva crispa	....	....	March 28	April 3	April 5	....	April 4	April 17	April 24
Rosa alba	June 29	....	June 6	June 18	June 19	June 6	June 26	June 12	June 16
—— canina	July 4	....	June 8	June 15	June 18	June 5	June 18	June 12	June 15
—— cinnamomea	June 16	....	May 21	June 4	June 6	May 23	June 18	May 26	May 25
—— damascena	July 7	....	June 19	June 21	....	June 19	July 12	June 12	June 25
—— gallica	July 11	....	June 19	June 24	June 26	June 11	July 2	June 13	June 20
—— provincialis	July 13	....	June 18	June 26	June 29	June 11	July 6	June 16	June 22
Salix caprea	....	....	....	....	March 28	....	March 30	April 17	
Spiræa hypericum frutex	June 5	....	May 21	....	....	May 19	....	May 25	May 14
Syringa lilac	....	....	....	May 4	April 29	....	....	May 17	May 11
Taxus baccata, mas.	....	....	Feb. 28	March 24	March 19	Feb. 2	March 6	Feb. 24	April 8
Triticum hybernum, in ear	....	June 25	May 31	....	June 17	....	June 25	June 19	June 15
—————— in flower	....	July 1	June 20	June 25	June 28	....	....	....	June 29

Remarks.

The observations during the last nine years were made 60 miles North of London.

The plants observed are common, either wild or in gardens. The latter, perhaps, being more immediately under the eye, may best be depended on.

Early Spring Flowers take a wider range in flowering than those which appear in flower during the Summer, owing to the greater uncertainty of the vernal season. Thus Anemone Hepatica varies 45 days, Corylus 48 days, Daphne Laureola 54 days, D. Mezereum 52 days, Snowdrop 36 days, Helleborus hyemalis 40 days, Cowslip 40, and Primrose 31 days, Apricot 33 days, Ranunculus ficaria 48 days, Violet 39 days. Whereas, the range of the Orange Lily is 29, and that of the White Lily 27 days. The average range of the 6 Roses is 28 days in 8 years; and Wheat varies 11 days in 5 years.

The ordinary range of Cratægus Oxyacantha or Hawthorn is about 19 days, but the difference between the years 1775 and 1782 is very remarkable. In the former, the flowers were budding on the 16th of March, and were fully out on the 30th of April. Whereas, in the latter, the first flower that I could hear of as being open, was on the 25th of May; and the flowers were not generally open until long after. There was no summer before the 14th of June, and to that time the whole season was remarkably wet and cold. It is to be lamented that no other observations were made during this inclement spring. But it would not have been fair to take such an extraordinary season into an average account of the times of flowering any more than the mild December of 1806.

MEMORANDA

FOR A

HISTORY OF HUSBANDRY.

ADVERTISEMENT,

BY THE EDITOR.

IN the Memoirs of Mr. Stillingfleet we have adverted to his intended History of Husbandry. We here give an analysis of the plan, interspersed with such extracts and remarks from his Memoranda, as may either develope his design, or gratify the curious reader, though the want of materials, and the vague nature of his references, must render our sketch in many parts extremely defective.

The work seems to have been naturally divided into two parts; the first relating to antient, the second to modern Husbandry. Under the first head, after casting a rapid glance over the ruder ages of Society, and the rise of Agriculture, he traces its progress from Egypt to Greece and Italy. Under the second he purposed to examine the state of this first and necessary art in every quarter of the world; then to exhibit its progress in Britain; and, finally, to lay down an improved System both in principle and practice.

MEMORANDA

FOR A

HISTORY OF HUSBANDRY.

INTRODUCTION.

SAVAGE AND PASTORAL LIFE.

THE History of Agriculture, being the History of the early labours and occupations of mankind, presents various views of society, and every stage of rude and civilized life. This was a subject on which the warm and sensitive imagination of Stillingfleet dwelt with delight; and, although the purport of his work was to prove the advantage of Agriculture, and the comforts of a permanent habitation, he does not the less expatiate on that ideal period of simplicity and innocence which was honoured by the antient poets with the title of the Golden age; and he has collected numerous references to those passages of their works where this blissful state is described with such warmth of colouring and fancy.

Reviewing the state of those people who lived without agriculture, he observes:

"When we consider that injustice, slavery, and oppression, are established, as it were by law, in almost every part of the globe, we cannot help doubting, at least, whether civil government is at all preferable to the savage state of Nature, with all its wants and all its vices. We ought not therefore to be surprized at the encomiums we meet with in the Greek writers of the Golden Age, that is, the age when men lived by hunting. I say we ought not to be surprized, or induced to suppose these descriptions the dreams of heated imagination only; for the first describers lived near enough to that age to have had accounts of it that were handed down by their forefathers. Among these describers is Hesiod. He, perhaps, took his idea of the Golden Age from the Arcadians, who were taught by Lycaon to live upon the fruit of a particular species of the oak, whose acorns are much sweeter than those of the common sort. These were the only people that never changed their seats during all the disturbances to which Greece was exposed. They led a pastoral life, the country being mountainous and poor; and were always famous for music and poetry, as appears by the testimony of Polybius, who was himself an Arcadian. They used to sing stanzas *impromptu*, like the Improvisatori at this day in Italy; and are so represented by Virgil *.

"That the first describers of the Golden Age spoke only the pure feelings of Nature, I am convinced by Charlevoix, who, in his account of North America, says: 'Were we always to sail just as I then did, we might possibly be tempted to travel to the end of our days. I recalled to memory those antient patriarchs who had no fixed place of abode, who lived in tents, who were in a manner the masters of all the countries through which they passed, and who enjoyed in peace and tranquillity all their productions, without the plague inevitable in the possession of a fixed estate. How many oaks represented to me that of Mamre †! How many fountains reminded me of that of Jacob! Each day a new situation chosen at pleasure; a neat and commodious house built and furnished with all necessaries in less than a quarter of an hour, and floored with a pavement of flowers, continually springing up on a carpet of the most beautiful green. On all sides simple and natural beauties unadulterated, and inimitable by art. If these pleasures sometimes suffer a little interruption, whether by hard weather, or some unforeseen accident, it is only to render them more sensibly felt at a second enjoyment.'

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* Ec. vii. v. 4:

——— Arcades ambo
Et cantare pares, et respondere parati.

† Where Abraham dwelt. Gen. chap. xiv.

"Speaking of the Indians also he observes: 'It must be confessed that their way of life seems at first glance very rude; but, besides that nothing is hard in this respect but by comparison, and that habit is a second nature, the liberty which they enjoy compensates sufficiently the loss of those conveniences of which they are deprived. What we see every day in some who are beggars by profession, and in some peasants, furnishes us with a sensible proof that happiness may be found even in the bosom of indigence. Now the Indians are still more really happy; first, because they believe themselves so, as being in possession of the most invaluable gift of Nature; lastly, from being utterly ignorant of, and without so much as the desire of knowing those false goods which we so much admire, which we purchase at the expence of real ones, and which we so little enjoy.'

"He then tells a story of some Iroquois in France, who, after having seen all the pomp of Paris and Versailles, would have preferred their own villages to the capital of the most flourishing kingdom in Europe, had they not seen the street de la Hachette, where the cook's shops, in which they found a constant supply of all sorts of eatables pleased them highly. No European, particularly no Frenchman, who had not lived amongst the Indians, and who had not a great deal of good sense, but would have attributed this indifference of the Iroquois to stupidity.

"It is remarkable that Charlevoix, who was born and educated in a country famous for its enthusiasm for every thing which bears the name of politeness, and for attachment to its government, should speak so warmly in favour of the savage life. This is a strong testimony."

After reviewing the state of the wandering hunter, or savage, our author proceeds to that of the herdsman and shepherd, or pastoral life.

"Of all kinds of life the pastoral seems to be most congenial to the nature of man. It is a middle state between the savage and the civilised, and partakes of what is best in each of them. On one hand there is the wandering and freedom, of both which men are passionately fond; on the other, the family society, which makes the principal happiness of life. Of this the hunting savage is in a great measure deprived; and wandering and freedom are wanting to the settled citizen. Besides, the shepherd, or herdsman does not wholly depend on chance for his daily bread, like the savage; nor has he the same anxiety about providing for a family as the citizen. Milk and cheese, and now and then flesh, are supplied by his camels, mares, his kine, his sheep, his goats, which are not only sufficient for present subsistence, but are a sure and easy provision for posterity, if they have but health and strength, which in that state of life seldom fail.

"I know these ideas will be regarded by many as the dreams of a poetical imagination, and fit only for a romance, where Arcadia is the scene of action. But I have had such dreams for many years; my ideas are taken from the present state of things in very extensive tracts of country. Arabia and Tartary afford me proofs of what I have advanced; and I am certain when the reader finds the Laplander added to the list of my happy people, he will acquit me of poetical enthusiasm. That state in which the body of a people in general approach the nearest to equality and simplicity, so far as it is consistent with public welfare, is certainly the most perfect; and that surely is the pastoral state. I own, that the arts and sciences, on which we pride ourselves so much, afford wonderful instances of our intellectual powers; but whether they conduce to our happiness I much doubt, or if they do, it is often in order to supply wants which we have brought upon ourselves, and which do not necessarily arise from our nature. By our exalted theories we are almost, if not quite, able to tell the distance of the sun, and all the planets, from the earth; but we cannot therefore suit our operations to the motions of the sun and moon better than the Tartar, who knows not perhaps whether the sun be farther from us than the moon. The patriarchs could travel over the wildest deserts as well and as surely as our astronomers; and what is still more, had not so much difficulty in getting a good dinner, when there was no such thing as public houses or markets, as many a modern gentleman of inferior rank but finer taste has in the midst of a town stocked with delicacies, brought in from all parts both of land and sea. But, let us do what we please, Nature will not give up all her prerogative; she will force us, at intervals, to feel what we are made to feel.

"When we imagine the old patriarchs, surrounded by their flocks and herds, in company with their wives and children, reposing under a cypress or palm, near a clear stream, enjoying the fresh air, and either taking their repasts, or receiving with hospitality their friends or guests, we cannot help feeling more pleasure, and looking with more veneration, on such characters, than on the greatest princes in all the pomp of a polished court. The picture of an Eastern family travelling is to the eyes very striking; Jacob going into Egypt, or meeting Rachel at the well of Haran, afford subjects for landscapes of the most pleasing kind; while Louis the Great, with all his courtiers about him, in the gardens of Versailles, would make as insipid a figure as my Lord Mayor and the Court of Aldermen in a city procession."

PART I.

SECTION I.

Proofs of the flourishing State of Agriculture in Egypt at an early Period.

THESE notions, that the happiness of the savage and pastoral state is superior to that of civilised life, which Mr. Stillingfleet justly termed the dreams of a poetic imagination, were soon relinquished. His good sense and knowledge of the wants, miseries, and vices, attendant on such a wandering and unprotected existence, led him to examine the superior advantages of the agriculturist, and the comforts of a stable government and permanent possession of property.

He lays it down as a fundamental principle, that without agriculture there can be no cities or large communities, nor even a numerous population. In every instance savage countries are thinly inhabited; and while four cultivated acres sufficed for a Roman Senator, as many hundreds are required to maintain one hunting savage.

"Agriculture," he continues, "is not an obvious invention; and I agree with Plato, who says, it was not discovered by human art, but imparted to man by Nature and Providence. My opinion is also confirmed by the Persian tradition, that it was brought from heaven to Adam by the angel Gabriel. Notwithstanding the assertions of the Greek and Latin writers, neither wheat nor any species of corn has ever been found in a wild state; a proof that the present perfection of those grains must have been the effect of culture; and that this art must have been derived from divine suggestion."

This idea he establishes by the testimony of Scripture, in numerous passages, extracted from Genesis, relative to the first cultivation of the earth, and the use of grain, which our translation renders *bread;* from the condemnation after the fall, "thou shalt eat bread in the sweat of thy brow," to the time of the flood.

"How far, however, cultivation was carried in the antediluvian world we are not specifically informed from the sacred writings; but we may conjecture that it had been extended to various articles of provision and pleasure; for immediately after the flood Noah is called a husbandman, and said to have planted the vine, which implies an improved state of the art.

"Sufficient mention is made of the use of grain for food between this period and the account of Egypt, to prove that agriculture was practised, and handed down from father to son, though united in a greater or lesser degree with the pastoral life; and it could not be thus practised during a long series of years, without considerable improvements.

"Xenophon justly calls agriculture the mother and aliment of the arts and sciences; and Varro observes, that the discovery of corn caused men to leave their rude and barbarous life. And there can be no doubt but those people who first devoted themselves to the regular cultivation of the earth were the first to become powerful and civilised. The Greeks, aware of this truth, endeavoured to appropriate to themselves the honours of superior antiquity, by making their Ceres the inventress of agriculture, and the patroness of laws; and by erroneously maintaining that wheat and barley, the two most essential articles of human subsistence, were first found wild, in Sicily, Crete, and Attica."

But, notwithstanding his fondness for that elegant and accomplished nation, Mr. Stillingfleet justly censures their insufferable vanity, in thus arrogating to their countrymen every useful invention, and their claims to superior antiquity. He proves that all their gods and demigods, to whom they ascribed the invention of agriculture and the social arts, were originally supposed to have been natives of Egypt, or to have derived their knowledge from that country.

He next endeavours to establish the conclusion, that the Egyptians, if not the inventors of agriculture, were at least the first people on record among whom it flourished; and that long before the existence of any political society in Greece, Egypt was the granary of the adjacent regions, and their resource in times of famine. For this purpose he intended to enter into an elaborate investigation, as appears from his numerous collections of every circumstance, however trivial or detached, which contributed to support his grand principle; and his extensive references comprise almost every author, from the Mosaic writings and the earliest Greeks, down to the then recent travellers Norden and Pocock.

He says, "That Cham, or Ham, the son of Noah, went into Egypt, and settled there, is the opinion of most writers; and that the patriarchal religion continued in that country even till the days of Abraham is asserted by Jablonski, who has treated the Egyptian Theology in a more satisfactory manner than any other writer with whom I am acquainted. His learning, solid judgment, and knowledge of the Egyptian language, qualified him to clear up, in some degree, this very obscure subject.

"That Abraham, after the deluge, came from Ur, a city of the Chaldees, to Haram in Mesopotamia, we know from Scripture, *Gen.* xi. 31. From hence he passed into the land of Canaan; but continued to follow the same wandering or pastoral life, to which he had been accustomed; for it is said, in *Gen.* xiii. 2. that he was rich in cattle; and, *ibid.* ver. 5. that Lot, who went with him, had also flocks, and herds, and tents; and the land was not able to bear them, that they might dwell together; so that Abraham and Lot agreed to separate. ver. 9. This plainly shews that they led a pastoral life, and principally depended for subsistence on their flocks and herds, as the Bedouin Arabs do at this day. But that at this time the Egyptians were become a regular society, subsisting by agriculture, and living in a settled state, appears from the same undoubted testimony. In *Gen.* xiii. 10. it is said, that the plain of Jordan was watered every where, before the Lord destroyed Sodom and Gomorrah, even as the garden of the Lord, *like the land of Egypt.* These words convey a most magnificent idea of the state of Lower Egypt. They prove that it was cultivated and intersected with canals, which, from a mere marsh, converted it into a rich and habitable soil; and the subsequent history of Joseph, the third descendent from Abraham, shews that Egypt was at no great distance of time a vast monarchy, under a single head, populous and fruitful almost beyond imagination,

" Sir John Marsham, the great Chronologer, as Sir Isaac Newton justly calls him, was misled in attempting to explain the Egyptian antiquities; and, with all his judgment, sagacity, learning, and industry, was unable to reconcile the inconsistent accounts of the old historians. He was of opinion that several dynasties or separate states existed at the same time in Egypt; but this is overturned by evident proofs. The idea of several independent states, separated by no natural barrier, is incompatible with the greatness and magnificence of the Egyptian monuments. Such must be the work of a numerous and rich people, perfectly at peace with their neighbours; and even when considered in this light they are wonderful. But the wonder is explained if we compare the state of Egypt in early times with that of the rest of the world. That country has natural barriers against all its neighbours; the sea to the North; vast tracks to the South; sandy deserts to the East; and a most dangerous bay to the West. The Egyptians possessed the knowledge of agriculture, the mother of plenty, at least in those days, and consequently the mother of populousness. From agriculture arose property, laws, order, civil government, discipline, obedience, union, strength. Their neighbours were wandering tribes, and consequently without power to give them molestation; so that they were at leisure to apply to the arts and sciences, and at the same time to raise those stupendous structures which have excited the wonder and curiosity of mankind in all ages.

"From the description of Lower Egypt as it existed in the time of Abraham, we may infer that it must have been long before in a state of cultivation. For any one who knows the history of mankind, and appreciates the difficulty of draining a large tract of country like the

Delta, will at once see that such a work would not have been conceived, much less undertaken, but under a regular and established government, and by a numerous population.

"The canals of Egypt are at once the most wonderful and most useful monuments of human greatness. The Pontine Marshes, not far from Rome, which are so noxious to the health of the neighbouring inhabitants, are said indeed by Livy to have been drained during the Consulship of Cethegus, A. U. C. 594; but we may justly doubt whether the work was ever effectually performed, as Suetonius says, that Julius Cæsar, an hundred years after, intended to undertake it at the time he was put to death. With him it ended, and part of the country remains a marsh to this day *. A stronger proof cannot be given of the greatness as well as the wisdom of the antient Egyptian Kings, than that they were able to finish a work far superior to that which baffled the lords of the world.

"I have taken it for granted that Lower Egypt was once a marsh, not only because Herodotus and other antient Greeks who visited Egypt all assert it; but because it has been an acknowledged fact from the ear-

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* Pius the Sixth completed this work during his Pontificate, though with less success and stability than the draining of the Delta by the Egyptians.

liest times, and is uncontrovertibly proved even by the present appearance of the country *.

"This being the case, it is evident that agriculture could not have begun in Lower Egypt: for such extensive public works as the canals necessarily require a great population; this requires settled habitations and towns, and such cannot be maintained without the cultivation of the earth. We must therefore look elewhere for the origin of agriculture.

"I am sensible Sir Isaac Newton thought that corn was first cultivated in Lower Egypt; but whatever regard ought to be paid to so great an authority, I can by no means adopt an opinion which seems to contradict the natural course of things, especially as it is founded on no historical testimony. I cannot help observing that he seems to have been misled by the Greek writers in many respects concerning Egypt. He attributes the formation of the canals to Sesostris; but how he found in Sesostris the Sesac of the Scriptures I cannot comprehend; for, according to Chronicles †, Sesac went

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* Those who doubt this fact are referred to the sensible dissertation of Major Rennell on the alluvions of the Nile, in his work on the Geography of Herodotus. That able and scientific Geographer not only confirms the assertion of Mr. Stillingfleet, but is of opinion, that the whole of the Delta as far as Memphis was originally formed by the depositions of the Nile, and gradually recovered from the sea. Geography of Herodotus, Sect. 18.

† 2 Chron. xii. 2—8.

up against Jerusalem in the days of Rheoboam; whereas, on the contrary, the prince or princes who rendered Lower Egypt habitable and fertile must have been prior to the time of Abraham.

"These facts being established, it is evident that the cultivation of the land must have been extended downwards, according to the course of the Nile, and consequently must have proceeded from Upper Egypt; and the situation and natural phænomena of that country render this supposition highly probable. For, while Lower Egypt was a marsh, formed by the depositions of the Nile, the principal part of Upper Egypt was a valley a few leagues broad, bounded by mountains, and on both sides declining to the river. Hence it was overflowed only for a certain time and season; the waters rapidly declined; and the ground, enriched by the mud, was soon dry, and in a state fit to receive seed.

"The process of cultivation in this country was also most obvious and natural; for the ground being every year covered with mud, brought by the Nile, and plants springing up spontaneously after its recess, must have given the hint, that nothing more was necessary than to scatter the seeds, and they would vegetate. Secondly, the ground was prepared by Nature for receiving the seeds, and required only stirring * sufficient to cover

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* "For the land whither thou goest in to possess, it is not as the land of Egypt, from whence ye came out, where *thou sowedst thy seed and wateredst it with thy foot as a garden of herbs.*" Deut. chap. xi. ver. 10.

it. From this phænomenon the surrounding nations learned two things: first, that the ground before sowing should be prepared, and cleared from plants; and, secondly, that the mixture of rich mould and sand would produce fertility, an axiom which is expressly laid down by Theophrastus, the first agricultural writer. I suppose, therefore, that some pastoral or wandering tribes, coming either from Ethiopia, or Arabia Petræa, to the valley of Upper Egypt *, and perceiving the advantages of so fertile a spot, which furnished abundance of pasture for their herds and flocks eight months out of twelve, took up a temporary residence during that time, and formed for their abode excavations † in the adjacent rocks, as was common in the early ages of the world; and such excavations exist in the vicinity of Thebes. After some time they established a more permanent settlement, began to cultivate the ground, and changed their grottos for more commodious habitations, which, from small collections of huts, gradually rose into great

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* In another place Mr. Stillingfleet observes from Pocock, Memnon was born in Æthiopia; his temple (the Memnonian) and statue were at Thebes, the first city, and perhaps formed by him: hence the honours paid him. He was more probably the head of a wandering tribe of shepherds from the Eastern parts, being called the son of Aurora, who first settled about Thebes, finding there all the conveniences for a permanent and regular way of life.

† At the present time the pastoral tribes in this part of the world frequently wander to the distance of 300 or 400 leagues, for the sake of a temporary supply of pasture, during the months of November, December, and January, after the Nile has receded.

and populous cities. What is here said about Upper Egypt may perhaps appear without foundation; because at present, in the vicinity of Thebes, water is raised by art. But this objection is obviated by the testimony of Dr. Pocock, who is of opinion that formerly Upper Egypt was overflowed in the same manner as Lower Egypt was afterwards, and is to this day.

"The existence of Thebes alone is a sufficient proof that Upper Egypt was once the seat of a great and powerful empire, before the neighbouring countries were brought into a state of civilisation and culture. Its antiquity and magnitude are proved from the poems of Homer, who frequently commemorates it as powerful in dominion, highly flourishing in the arts and sciences, and proverbial for its riches and splendour; while he makes no mention of Memphis, the capital of Lower Egypt. In the Iliad, Achilles, expressing his resolution not to remain in the Grecian camp, but to return to his native country, declares, that all the wealth of Thebes should not bribe him to change his purpose.

> "Not all proud Thebes' unrivall'd walls contain,
> The world's great empress on the Egyptian plain,
> That spreads her conquests o'er a thousand states,
> And pours her heroes through an hundred gates,
> Two hundred horsemen, and two hundred cars,
> From each wide portal issuing to the wars."
>
> POPE's Homer's Iliad, b. 9. l. 500.

"In the Odyssey the poet likewise describes Egyptian Thebes as under the dominion of Polybus, a powerful monarch, being in a high degree of splendour and magnificence, and giving presents of exquisite workmanship and great value to Atrides, who visited his court *.

"That these descriptions of the Egyptian Thebes were not exaggerated, is evident from the stupendous ruins still existing, which have excited the wonder of all travellers. This venerable city was not less than eighteen miles in circumference †; the date of its ruins, as Pocock

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* "A silver cannister, divinely wrought,
In her soft hands the beauteous Phyle brought;
To Sparta's queen of old the radiant vase
Alcandra gave, a pledge of royal grace,
For Polybus her lord (whose sovereign sway
The wealthy tribes of Parian Thebes obey),
When to that court Atrides came, carest
With vast munificence, th' imperial guest:
Two lavers, from the richest ore refin'd,
With silver tripods, the kind host assign'd;
And, bounteous, from the royal treasure told
Ten equal talents of refulgent gold.
Alcandra, consort of his high command,
A golden distaff gave to Helen's hand;
And that rich vase, with living sculpture wrought,
Which heap'd with wool, the beauteous Phyle brought."

POPE's Homer Odyss. b. 4. l. 165.

† Some say the circumference was twenty-seven miles. One of the temples, according to Strabo, was a mile and a half in circumference; the height forty-four cubits, and the walls twenty-four feet thick. This description was ranked among the Mendacia Græcorum

observes, is older than the foundation of most other cities; and yet such vast and numerous remains are still to be seen, and of such magnificence and solidity, as may convince any one who beholds them, that without some extraordinary accident they must have lasted for ever, which seems to have been the intention of the first founders."

He then argues, that so vast a city, the ruins of which evince such a proficiency in the arts, could not have been built, or even peopled, without a high cultivation of the earth; and this is the more strongly corroborated by the additional fact that Egypt contained more cities, in proportion to its extent, than any other country of antient times *.

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till Pocock and other modern travellers, ascertained the truth of the relation. See Pocock's accurate Account of the Great Temple at Carnac. Description of the East, vol. I. p. 92. See also the descriptions of Egypt by the English and French writers, who served in the recent war; particularly the Views of the ruins of Thebes, by Denon: from which it appears, beyond a controversy, that the Greeks took their orders of architecture from the antient Egyptians, though, with their usual taste, they made considerable improvements.

* The more Upper Egypt has been explored, the more proofs are discovered of the extent, splendour, and antiquity of Thebes. The opinions and descriptions of all travellers down to the present times concur in strengthening the idea of Mr. Stillingfleet, that Greece derived the principles of the arts and sciences from Egypt.

"I imagine," he concludes, "it will not be thought I have dwelt too long upon this obscure subject, when it is considered, that the first cultivation of corn is of all others the circumstance which caused the greatest revolution in human affairs, and gave rise to most of the religious mysteries and extraordinary superstitions of the Pagan world."

SECTION II.

Memoranda on subjects relative to the Husbandry of the Greeks and Romans—Eleusinian Mysteries—Hesiod—Theophrastus—The Vine, Miseltoe, and Cytisus—Geoponic writers—Virgil's Georgics—Pliny.

HAVING proved that Agriculture flourished at the earliest period on record, if it did not take its rise in Egypt; and that the Greeks drew their knowledge of agriculture from thence, he purposed to trace its subsequent progress and improvement in Greece and Italy. For this part of his work he has left numerous, though vague references to the classic authors of every description, who either expressly or incidentally treated on the subject; but these are in general too imperfect and unconnected to be submitted to the publick. It may, however, gratify the curiosity of the reader to insert some notices relative to agriculture in general, and to subjects connected with that art.

Eleusinian Mysteries.

MUCH has been written concerning the Mythology of the Greeks; and attempts have been made to ascertain from what source they drew their notions of their gods, whose names and attributes have been immortalized by their poets. In general, we may rest satisfied that they derived the knowledge of their deities, as well as all their religious rites and ceremonies, from Egypt. But, without attempting to pursue this matter higher, it is sufficient to observe, that it was the opinion of our author, not only that Egypt gave birth to the mythology of the Greeks and Romans, but even that the imported deities derived their origin from their connection with his favourite art of agriculture. In support of this opinion he remarks, that every idolatrous nation, both antient and modern, attributes to its gods, and the founders of its political state, the invention of agriculture, and the introduction of the concomitant arts.

No subject has perhaps more occupied and divided the literary world than the Eleusinian Mysteries, nor has any given rise to more singular and discordant systems. As parts of these mysteries were supposed to have some allusion to agriculture, they naturally drew the attention of our author. His opinion, at least, deserves notice, though it may be ranked among the visionary theories of other learned men.

" Eleusis is recorded as the place where barley was first sowed, and Ceres was called *Eleusinian* on account of this invention, which was the cause that men led a more heavenly and divine life. Pluto is said to have carried off the daughter of Ceres, because the seed lies buried under ground for some time *. The tale about her melancholy, and search after Proserpine all over the world is mere fable, and an addition of the same nature with what the Egyptians relate about Osiris, *viz.* that he disappeared, and was sought after by Isis; and with what the Phœnicians related about Adonis, that he was by turns six months above, and six months under the earth †.

"Hogs were sacrificed to Ceres, either because they taught the way of ploughing, or because they root up and destroy grain. About seed-time it was the custom to sacrifice to Ceres, and in the spring to offer up green corn. Poppies were also sacred to this goddess ‡.

"Ceres is called properly the legislatrix, or the law-giver. Men invented the mysteries of Ceres, as they began first to philosophise, when they had discovered the necessaries of life, and celebrated this festival as a memorial that, by her means, they left off fighting with one another merely for subsistence §.

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* Phurnutus, p. 209, 210, 211.

† According to Diodorus Siculus the rape of Proserpine was no other than the transmission of the discovery of corn from Egypt to Greece.

‡ Hence called, elegantly, by Virgil, "Cereale papaver." Georg. l. 1. v. 212.

§ "Prima Ceres unco glebam dimovit aratro,
Prima dedit fruges, alimentaque mitia terris,
Prima dedit leges. Cereris sumus omnia munus."
Ovid's Metam.

"This account, which is supported by innumerable passages out of the best Greek writers, gives, no doubt, the solution of all the inconsistent and extravagant fables which first rose in Egypt *, and from thence overspread Greece, Italy, and the rest of the world. The simple operation of sowing corn, with all the consequences naturally attending it, was a foundation more than sufficient for artful and designing men to build the superstructure of the Eleusinian mysteries. Phurnutus has mentioned some of the consequences; but there are others omitted by him not less remarkable. First, the seed, that seemingly lies dead in the ground, revives again. What an obvious image does this circumstance afford for teaching the doctrine of a future state! And it must be observed, that Herodotus, after mentioning the mysteries of Ceres, immediately and abruptly, without any connection, adds, the Egyptians first propagated the doctrine of a future state. But he does not say, what perhaps was the truth, that this was only a popular way of expressing what was explained in the mysteries to mean a common phænomenon, as perhaps the doctrine of transmigration arose from a like source. Secondly, this discovery of sowing corn being

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* Among other proofs that the Eleusinian mysteries came from Egypt, Mr. Stillingfleet refers to the indisputable testimony of Herodotus, who was himself initiated; who in his abode in Egypt, noticed the conformity of the Egyptian mysteries to those of the Greeks, and observes, that they were brought from Egypt by the daughters of Danaus, and by them revealed to the Pelasgian women. Eut. 171.

the cause that men led a more civilised and happy life, what could be more natural for the institution of the mysteries than to transfer to the effect of initiation the happiness of a life to come, which was in part true of the present by means of agriculture?

"What the secret tenets of the mysteries were I will not pretend to say; but that the belief of a future state was not there inculcated is most likely, because this was vulgarly embraced, and openly delivered, by most of the philosophers; nor can we suppose that the fables about the origin of their gods were there laid open, since, children not excepted, every Greek who was not a convicted criminal, could be initiated, and every Athenian was obliged to be so. Now it seems very extraordinary that a whole people should be admitted to partake of a secret which overturned the fundamentals of their established religion; at the same time that they carried on such a farce of zeal for it, as to punish, and even put to death, any man who should dare to oppose it.

"It seems likely that they had allegorised the art of sowing and propagating bread-corn to another purpose. The fathers, who had better opportunities of knowing these mysteries than we can have at present, by means of people then living, not all perhaps so perfectly silent as they ought to have been, mention some things which confirm my conjectures, and which are also related by Pagan writers.

Many of them, speaking of the mysteries, take notice of darkness and horror attending initiation, and the delightful scenes of light that followed. What is this but the story of Pluto and Proserpine allegorised to a moral sense?

"If I may be allowed to offer my conjectures on so dark a subject, I should be inclined to think that if they delivered any thing concerning their gods, contrary to vulgar notions, it was, that Jupiter, Ceres, Neptune, Apollo, Mercury, &c. only represented the air, the earth, the sun, the sea or the Nile, which I imagine were first venerated in Egypt, as in other countries, after men fell off from the worship of the true God. Now this doctrine might safely be delivered to the whole body of the people, without affecting the established religion; for it was only transferring their ideas from human creatures to celestial or terrestial bodies, whose influence must be acknowledged to be manifestly very great, as being the immediate and visible cause of all the operations in nature. Thus it seemed to be a refinement of the vulgar worship of Ceres or Isis, to consider her as the earth, the mother and nurse of all fruits; to regard Apollo as the sun, which, by its vivifying heat, causes every plant to flourish, or all of the deities together as co-operating in the production of all things *.

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* Many notes are scattered throughout these memoranda, tending to prove their identities. Three particularly relate to Ceres and Apollo,

"The solution here given seems in every respect consonant to the natural progress of human inventions; as a confirmation of this opinion, we find that corn or barley was indispensably necessary in the celebration of these mysteries. For we are informed by the Scholiast on Pindar, that barley was used as a crown for the victors in the Eleusinian games; and by Theophrastus, that fresh barley was sent for from Memphis to be employed in those mysteries, which were celebrated in April, before it was ripe in Greece *. Barley and wheat were also carried about in the Isean games."

and prove that it was the intention of our author to have extended his comparison.

Terra et Cœlum ut Samothracum initia docent sunt Dei magni.
VARRO, lib. 4.

Rhea Cybele mater magna, eadem quæ Terra vel Ceres. Mater magna Phrygia. Vid. Ovid. de Arte Amand. lib. 3. Quoniam ut, Augustinus è Varrone, terra gerit civitates turritas; sed ut mihi videtur Ceres, sive quod idem, Rhea inventrix agriculturæ causam dedit civitates condendi, quæ existere antea non potuerunt defectu provisæ frugis in annum. Sic inter Britannos nulla urbs ante agriculturam.

Heraclides, p. 416. says expressly, that Apollo and the Sun were different names for the same Deity, according to the doctrine of the Eleusinian mysteries, and even according to vulgar opinion.

* In Egypt December is mid-spring, when the whole country is covered with green corn and clover. We learn from Pocock that in some parts not far from Memphis, he saw fresh barley cut and threshed in February, which was probably sown before the inundation of the Nile, while in others it was not in ear.

Hesiod.

OUR author has made many references to old Hesiod, as the first writer on agricultural subjects, and purposed to examine minutely his system of husbandry, which he considered as one of the most curious remains of antiquity. He speaks of the Askrean poet with a just degree of fondness and enthusiasm, praises him as an inculcator of morality, œconomy, and industry, and takes particular notice of his foresight in recommending the farmer to provide himself with two ploughs, that his work may not be interrupted should one be broken or rendered useless [*]; a precept which he afterwards notices in the poetical calendar of Tusser [†].

Mr. Stillingfleet was particularly pleased with the plain and sedate character of Hesiod, no less than with his preceptive mode of imparting practical instruction, and the tokens which he points out to ascertain the proper times for the different operations of husbandry, from such natural circumstances as the singing of birds, and budding and flowering of plants. Of these notices Mr. Stillingfleet has availed himself in his Calendar of Flora. He is far from according with the opinion of Addison [‡], that Hesiod possessed more of the husbandman than the poet; for he calls him a fine poet, and alludes with pleasure to his own assertion, that the Muses met and inspired him, while keeping sheep under the sacred mount of Helicon. In such veneration, he adds, was he held, that, as we learn from Aristotle *, when the Thesprotians destroyed Askra, and the Orchomenians received the fugitives who escaped, the oracle ordered them to send for the remains of the poet who had given celebrity to the town.

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[*] Δοια δε θεσθαι αροτρα πονησαμενος κατα οικον, &c.

Εργαι και Ἡμεραι. l. 50.

[†] See his comparison of Tusser and Hesiod in the next chapter, article *Tusser*.

[‡] An Essay on Virgil's Georgics.

Mr. Stillingfleet even endeavoured to ascertain the peculiarities of the soil where he dwelt, as well to explain some of his precepts, as from regard to his venerable memory. "Hesiod," he adds, "lived at the foot of mount Helicon, at Askra, which he himself describes as a wretched village, in a soil bad in winter, hard in summer, and never good.

> Νασσατο δ' αγχ' Ἑλικωνος οιζυρη ενι κωμη
> Ασκρη χειμα κακη, θερει αργαλεη, ουδεποτ' εσθλη.
> Ἐργαι και Ἡμεραι, l. 257.

This is exactly the description of a clayey soil, which can be worked only at particular times, when the ground

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* Μουσαων Ἑλικωνιαδων αρχωμεθ' αειδειν
Αἱθ' Ἑλικωνος εχουσιν ορος μεγα δε ζαθεοντε
* * * * * * * * * * * * * *
"Ἁι νυ ποθ' Ἡσιοδον καλην εδιδαξαν αοιδην,
Αρνας ποιμαινονθ', Ἑλικωνος υπο ζαθεοιο.
Θεογονια. v. 1 and 2. and 23, 24.

is neither very wet nor very dry; or rather the complaints which he makes about the badness of his place might arise from the situation of mount Helicon to the South, so that it could not enjoy the North wind in summer, and was inundated in winter, whenever the snow was melted by a warm day.

"Although the situation of Askra might deteriorate the soil, yet the inundations to which it was subject might form a rich deposition, and produce effects similar to that of the Nile in Egypt. I have myself seen this happen at Foxley in Herefordshire."

Theophrastus.

BOTH the printed works and manuscripts of Mr. Stillingfleet give proofs of his admiration for a writer whom Cicero was accustomed to call his delight *. From this father of Botany our author drew the Calendar of Flora for Greece, which he published in his Miscellaneous Tracts, and which is reprinted in this Selection. He likewise made an abstract of his system, which will shew that the antients had sketched the great outlines of botanical arrangement, and laid the foundation on which modern botanists have raised this regular and beautiful superstructure.

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* Plutarch, Life of Cicero.

"According to Theophrastus*, the difference of plants arises from three things: 1. Having or wanting certain parts, as fruit and leaves. 2. Having them; but not alike in figure, colour, thickness, roughness, taste, &c. nor equal in number or magnitude. 3. Not having them in a similar position; for instance, some have them on the trunk, as the Egyptian Sycamine †; and some even under ground, as the Arachys. Some with, some without, peduncles or footstalks. And the same may be said of flowers; for some of these grow round the fruit, others not. Upon the whole, what is here said of position, is to be admitted, not only in regard to these, but to leaves and buds. Some also differ in order; for the branches of the oak are irregular, while those of the fir correspond with each other on opposite sides.

"Afterwards he divides plants into trees, shrubs, undershrubs, and herbs, and acknowledges the difficulties attending this mode of division, which have been noticed by many subsequent writers. He defines what he means by a root, a stalk, a trunk, a branch, a shoot; bark, wood, pith, sap, nerve, vein, flesh, flower, pedicle, tendril, catkin. He calls the palm which bears fruit the female. He distinguishes between different pericarpia, as a pod, a capsule, a vessel, and between angiospermous and gymnospermous plants, using many of the names adopted at present. He notices the difference between flowers as they come out separately, or in branches; and the situation of the fruit or receptacle, with respect to the flower. He observes, that some plants bear on shoots of the same year, some on those of a year old, others on both.

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* The work from which these remarks are taken is the History of Plants; a work which entitled Theophrastus to the appellation of Founder of Botany. This celebrated disciple and successor of Aristotle wrote several others on Natural History; such as "on stones, on the winds, on fire, on honey," &c.

† Ficus Sycomorus. Linn; συκομυρος, the sycamore of scripture, a huge tree common in Egypt. The coffins in which the mummies were preserved were made of its wood. See the figure Gerarde's Herb. Johnson's edit. 1509. (S.)

"Theophrastus also supposes genera and species. He notices the forms of seeds, and the time of blowing and budding. He states that the difference of leaf in ivy is owing to variety only; that other plants are uncertain in leaf; that some are said to sleep when they close their leaves. He observes that wheat and barley come out with one leaf only, peas with many. That the seed [*]

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[*] Theophrastus, l. 1. c. 18. shews great accuracy and knowledge in his considerations on seeds; he calls the generation in them, the ὑγρον και θερμον συμφυλον, the principles of *heat* and *moisture* INNATE; and on the deficiency of either, he compares the seed to an ωον ουρινον, an addle-egg. He then adverts to the difference in seeds of different genera. He classes together the cocoa-nut, the walnut, and almond, as having a shelly cover-

in plants answers to an egg in animals; that whereas some think barren plants are produced without seeds spontaneously, he imagines rather, that the seeds escape our observation, as those of the Elm, Sallow, and Cypress. But this wants farther examination. Let not any one imagine this to be a slight conjecture, for Lord Bacon overlooked it.

"Theophrastus also supposes that trees received nourishment from their leaves; a conjecture first revived by Dr. Hales, after a lapse of 2000 years. Also that the bud of a tree is like a plant in the ground. He notices various uses of the different kinds of pericarpia to preserve the seeds. He compares the fecundation of

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ing. Next the *drupe,* or the olive, as consisting of σαρξ και πυρην, caro et nucleus. Next the lobated, the membranaceous, and the capsular pericarps, with the remarkable terms of αγγειοσπερματα, γυμνοσπερματα, ενυμενοσπερματα, adopted by all subsequent botanists. He then proceeds to what he calls the αρχη προσφυσεως, by which he means the *corculum* of Linnæus and subsequent botanists, and which, in the generality of plants, divides on germinating into two separate parts, the *rostellum* tending downwards, and producing the root, and the *plumula* tending upwards, and producing the stem, branches, &c.—In l. viii. c. 2. he talks of the seeds of gramineous plants, and says, that the αρχη, or corculum, is not united together, as in other seeds, but that they germinate, εκατερον εξ εκατερου, i. e. the *rostellum* is on one end, and the *plumula* on the other. This is an accurate description of Monocotyledonous plants, where the lobe is single, and unites and embraces, as it were, the *rostellum* and the *plumula.* (S.)

the female palm by the male dust, to what is supposed to happen in the generation of fishes.

"Theophrastus is of opinion that a mixture of soils produces the same effects as manure *. The inundations of the Nile brought a rich mud over a sandy ground, while the Euphrates drove sand over a rich soil, and both mixtures occasioned fertility.

"From these two facts, Theophrastus laid down the rule to mix sand with clay, and clay with sand. Though two thousand years have elapsed since he gave the precept, yet it is only of late that it has been regarded in England. The Spaniards, indeed, used this method, and they probably adopted it from the Moors, who learned it in Egypt.

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* In addition to this most curious and just observation of Mr. Stillingfleet, I would note the accuracy of Theophrastus, in describing the different qualities of dung considered as manure, l. ii. c. 8. After enumerating six species from different animals, he concludes, η συρματιτις αλλη, και αλλως· by which he seems to imply that he meant to treat of this as a separate thing. The κοπρος συρματιτις is by some supposed to be straw-dung; but Scaliger, from the word συρματα says, *fimus in quisquiliis*, Scavenger's dung. I think, from the word συρω, *traho*, to collect together, that it was similar to our compost heap of manure. This gives a high idea of agriculture three thousand years ago. The practices introduced into horticulture in these days are equally curious, and many of them have been since lost. (S.)

"I could produce many pages from his work full as curious as these, relating to Gardening[*], planting trees, the soils suited to each kind, and their uses for the various purposes of life. I shall only observe that the great defect in this noble work is, that the author omitted to describe plants, being in general content to call them barely by names[†]. This defect, and the great incorrectness of the text, diminish much of the pleasure in the perusal. However, he formed a Pliny, a Gesner, and a Cæsalpinus*, and they formed all the rest.

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[*] The observations of Theophrastus on other parts of Natural History are equally interesting. He has recorded the transmutation of insects, and their three stages of existence, which he calls καμπη—χρυσαλλις—ψυχη corresponding to *Larva*—*Pupa*—*Imago* of Linnæus; on which I would remark, that καμπη is a very apposite name for those *larvæ*, or caterpillars, which are called *Geometræ* by Linnæus, whose mode of march is like the advancing of the feet of a pair of compasses; as they bring up the tail to the head (the whole body being in a curve), then detaching the head, they push it strait forward for a second advance—The *Pupa* state was termed χρυσαλλις, from its being in many species covered with golden tints, and the term Chrysalis is retained by many writers. But the most remarkable circumstance is the term ψυχη, as applied to the last or perfect state. This being the same with the Greek term for "the soul," is a convincing proof that in very early times the transformations of insects were looked upon as types of *life*, *death*, and *immortality*.

The curious circumstance of particular *larvæ* being attached exclusively to different species of plants was known to Theophrastus, as likewise what is called the caprification of the fig, by a peculiar insect, which he calls ψην, the *Cynips Psenes* of Linnæus, Syst. Nat. 919. His observations on this subject extended to the minutest particulars. (S.)

[†] Theophrastus does not merit the imputation of not describing plants in general. His method was to describe separately

the different parts. He describes the stems of plants in one chapter, the leaves in another, the root in another; and so of the flowers and seeds; and, as was to be expected from an observer of Nature, before an artificial system was introduced, he groupes together those plants which have natural affinities. This is his general method; but in the third book, the 9th, 10th, and following chapters, he begins to describe generally, and in many instances in a diffuse manner, particular kinds of trees, &c. The corruptions of the text, and the technical language which he uses (as words frequently occur which are not to be met with in Lexicons, nor any antient author), render it very difficult to comprehend his meaning: but a Botanist, who is acquainted with the subject under description, has greater advantages than the general scholar; and I have in so many instances evinced the accuracy of his descriptions, that I can pronounce him well worthy the labour of investigation. Scaliger, Bodæus, and Constantinus, his commentators, frequently pass censures on Theophrastus which must at last recoil on themselves. (S.)

* With respect to Gesner, Cæsalpinus, and Bauhin, they availed themselves of the description of Theophrastus in ascertaining several species of plants; but it is to be lamented that none of these botanists undertook a commentary on Theophrastus. The want of such a commentary, however, will be soon supplied by the ingenious friend, to whom I am indebted for the substance of these notes, John Stackhouse, Esq. who is employed in printing illustrations of Theophrastus at the Clarendon press. For this task he is peculiarly qualified by his intimate acquaintance with the Greek tongue, and knowledge of scientific botany.

On the Vine.

MR. Stillingfleet, having adopted the opinion that agriculture originally gave rise to the Heathen deities, and that the Greeks, having drawn their knowledge of agriculture from Egypt, received from thence also their gods and religious rites, supposed that Ceres was the same as Isis, both being the discoverers of corn; and on the same principle that Bacchus was no other than Osiris. He draws many extracts from Diodorus Siculus, Strabo, and other antients, to prove this identity, and notices the conformity in the history of the two last deities, particularly in the accounts that they were both torn to pieces, and their scattered limbs reunited. This he considers as emblematical of the vine, which, after being *cut* and *pruned* or transplanted, is restored to vigour by its parent earth.

He believed also, that the vine, like grain, was brought from Egypt. He remarks, from Hellanius, that the Vine was first discovered in Pleutheria, a city of Egypt. Therefore Dion the academic accuses the Egyptians of being given to wine; and adds, that those who could not afford to drink it, found out the way of making beer, which affected them so much, that they would dance and sing, and act like those who had drunk wine." Athenæus, p. 34.

Several sorts of Egyptian wine are mentioned by the antients.

"*Vinum Mareoticum.* There are abundance of vines in the district Mareotis, the grapes of which are most delicious to eat, and make an excellent wine. It is white, sweet, of an agreeable smell, gets into the veins, and is diuretic *.

Vinum Saneaticum is still better than this; it is of a greenish white, has something of an oiliness, which is dissolved when mixed with water, like Attic honey, and has, besides its sweetness, an aromatic taste, a little rough. All along the Nile there are plenty of vines. The wines in different places have different qualities; but that about Artylla near Alexandria, surpasses them all. The Egyptian and Persian kings, successors of Alexander, gave the revenue arising from this wine to their queens for pin-money. The wine of *Thebais*, and particularly Coptos, was so small, that it was given to patients in a fever. Athen. p. 33.

"That the vine was inoculated and ingrafted, we have the testimony of Theophrastus, the geoponic writers, b. 4. c. 12. and Pliny, l. 17. c. 21. Most likely it was the first* tree which was ingrafted, because the juice of the grape is the most precious of all liquors, and therefore mankind would endeavour to improve it by all possible means; next, because the vine requires pruning more than any other fruit-tree, being so luxuriant in its growth, that, without pruning, the fruit could not ripen for want of sun; and when it was found to bear so much cutting, it was natural to try other experiments, particularly as the juice runs so freely, that the circulation may be continued from the stock of one to the branch of another, so as to incorporate them[*].

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* Virgil mentions Mareotic grapes:

> "Sunt Thasiæ vites, sunt et *Mareotides* albæ."
>
> Georg. lib. ii. l. 90.

Commentators (see Martyn's note on this passage) have doubted whether the country from which these grapes derived their name was a district of Egypt, Libya, or Epirus, but the expression of Horace decides the question, when in his beautiful Ode on the Flight and Death of Cleopatra, he says,

> "Mentemque lymphatam *Mareotico*." Lib. i. Ode 37.

From Mr. Barry's treatise on the Wines of the Antients, and from several passages in Horace, it appears that their wines were so strong as to require dilution with water. (S.)

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* Though grafting and budding were known in the time of Theophrastus, as is evident from the terms εμφυτεια and ενοφθαλμισμος, lib. 2. c. 1. yet it does not appear that they were commonly practised with regard to the vine. The reason occurs in the same book, namely, that the vine strikes freely from cuttings; but the apple or pear with difficulty.

Virgil also says:

—— "*propagine* vites,
Respondent melius." Geor. ii. v. 63.

Descriptions of the root, bark, leaves, stem, &c. of the vine occur, lib. 1. c. 8, 9. 16. 19. 21, 22. and it is a curious fact in regard to the high cultivation to which it was brought, that the different sorts are said to be too many to be enumerated, lib. 1. c. 24. But he notices a few: the αμπελος καπνιος, with white and black grapes on the same bunch, called by Pliny Vitis Helvola, is described in lib. 2. c. 4. and the αμπελος Ιδαιος with a small round leaf without lobes l. 3. c. 17. This is a true Linnæan species. In the Species Plantarum, Vitis Indica occurs with cordate leaves; but the habit is that of V. Labrusca, though the *habitat* does not agree.

In the fifth book de Causis Plantarum, Theophrastus describes a method of raising vines, to produce stoneless grapes, by taking out the μητρα, heart, or pith, of two shoots, except the lower parts, binding them together to unite them, and planting them in the ground. Pliny, lib. 14. c. 21. mentions this method on the authority of Columella, who is said to have practiced it with success; and Palladius recommends it, not from experience, but from the authority of the Greek writers, lib. 3. (S.)

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[*] With respect to its culture, the vine is said by Theophrastus to require frequent digging; he calls it *φιλυδϱος*, a lover of frequent watering, and says, it requires pruning more than other trees, which he terms *διακαθαϱσις*, a clearing out of the inner branches to admit the air; a slight summer digging, which he terms *σκαλσις*, is of advantage, as he thinks the dust raised by that operation served as a manure to the plant, l. 2. c. 8.

The peculiar diseases of the vine are two. 1. The *αμπελος τϱαγα*; This Pliny calls *hirculatio*. It arises either from a blight at the first putting forth of the shoots, or from injurious treatment; or, by pruning with the cut exposed to the sun or rain. This disorder is a too great luxuriance of leaves and shoots, and a swelling at the joints. The other is termed *ϱοας*, and arises from a blight at a later period; viz. at the setting of the fruit. The effect is, that the fruit drops off partially, and the remaining grapes are small. He advises likewise the greatest care in digging, not to injure the root, l. 4. c. 16. It should be added, that the vine must not be cut with a knife after the grapes begin to turn colour; at that time nothing is to be done except plucking off the young shoots, lib. 2. c. 8.

Theophrastus mentions also a curious method of promoting fructification in the vine, should it shoot too luxuriantly, and not bear fruit. This is practised by slitting the lower part of the trunk, and placing a stone in the slit to prevent it from closing; for the wound thus kept open will operate as a help for the superabundant sap to flow off, and the remainder is more easily concreted, and becomes sweet.

A singular antipathy is also recorded between the vine and the cabbage and laurel, which is so striking that if planted near

"There is no tree to the parts of which the antients applied so many particular appellations as to the vine*; for instance, οιναριον the leaf, in latin *pampinus*, κλημα the shoot, in latin *palmes*, κλαδευω taking out the large branches, κλαδος a pruning, γιγαρτον *vinacea*, ραξ, vel *acinus* the grape-stone, *uva*, a single grape, βοτρυς a bunch, σταφυλη grapes in general, οχα a branch of the vine with the grapes on it, palmes, ομφαξ, *uva acerba immatura*, an unripe grape, or more frequently the inspissated juice. Now I consider it as certain, when there are terms appropriated to every minute part of any thing, that it has in a peculiar manner drawn the attention of man, and no wonder that the vine should do so, when we consider its effects on the human constitution."

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each other the vine averts its branches, and looks the contrary way, the smell being as it were hostile." This is probably true, and may be accounted for from the irritability of plants. (S.)

* In p. 51 of "Anonymiana; or, Ten Centuries of Observations, &c. by a late very learned and reverend Divine," lately published by Mr. Nichols, a similar observation occurs. "The Romans had so much concern with the vine, and its fruit, that there are more terms belonging to it, and its parts, its culture, products, and other appurtenances, than to any other tree:

"*Vitis*, the tree; *palmes*, the branch; *pampinus*, the leaf; *racemus*, a bunch of grapes; *uva*, the grape; *capreolus*, a tendril; *vindemia*, the vintage; *vinum*, wine; *acinus*, the grape-stone."

It is singular that the vine in our language is, I believe, the only tree (except the palm, whose fruit is called dates), of which we have different names for the fruit and tree, as vine for the tree; grapes, for the green, and raisins the dried fruit.

Miseltoe.

"TO supply the deficiency of spring grass, in Greece and Italy, the husbandman employed many shrubs as fodder, particularly the miseltoe and the cytisus.

"Theophrastus and Pliny * say, that it was the custom to feed oxen with the miseltoe, hyphear, and stelis after harvest. Hyphear is supposed by some to be a kind of miseltoe, and it is certain that it grew on the oak. Stelis has been erroneously mistaken for fenugreek, but the authority of Dioscorides will not prove that the name was used for that plant in the time of Theophrastus.

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* Theophrastus seems to say that the ιξια, or viscum of Linnæus, was called ϛελις by the Eubœans, and ὑφεαϱ by the Arcadians; but he thinks this to be a mistake originating in their being all of them parasitical εν ἑτεϱοις φυομενοι. De caus. pl. l. 2. p. 154; he further observes, that they do not resemble in habit of growth, nor in the mode of fructification. It is true that the antients used all these for fodder; for it is said afterwards, "they feed in a green state, or soil cattle with these." There are many *epidendra*, or parasitical plants, known to modern botanists, and the ϛελις seems referred to the genus *Loranthus*, which is called by Linnæus Lor. stelis. (S.)

According to Pliny, who took his observations from a corrupt passage of Theophrastus (lib. 14. c. 44.) the miseltoe differed from the hyphear and stelis, being more ill scented, bitter, and viscous; and though it principally grew on the oak, yet it was sometimes found on other trees. The hyphear and stelis, he says, were only different names for the same plant, when growing on the fir and larch. It was called stelis in Eubœa, and hyphear in Arcadia. The hyphear was the plant principally given to fatten cattle and sheep, though it was to be used with great discretion, and in particular seasons and circumstances, otherwise it operated as a violent and dangerous purgative.

" Most probably the miseltoe gave the first * hint of engrafting; and perhaps all the virtues attributed to it by the druids and magicians might have taken their rise from this circumstance, for it is found on trial to be without virtue: but, as it had been made sacred because it gave occasion to discover the wonderful and useful art of engrafting, it was natural in length of time to drop the true reason, and substitute another in its room. Thus the relics of saints, which were at first

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* That the miseltoe gave the first hint of engrafting is expressly said by Theophrastus: "The birds, by eating the fruit, void the seeds unhurt, which, sticking to the branch, vegetate; exactly in the same manner as the graft, or the bud, having the nourishment for the root ready prepared and concocted." Pliny also gives a very natural account of the introduction of grafting, from the observation of one tree growing in the knots and clefts of another from the seeds scattered and left by birds, l. xvii. c. 14. And Virgil's account of budding was by finding a *natural cleft* in the bark to insert the bud, and to bind round with the inner bark or *liber*, Georg. ii. l. 76. and hence he observes, by a beautiful poetical figure, that the parent stem is astonished at the production of *unusual* leaves and fruit.

Miraturque *novas* frondes et non *sua* poma. Ib. (S.)

The mother-plant admires the leaves *unknown*
Of *alien* trees, and apples *not her own*.

DRYDEN.

preserved as memorials only, in after-ages were considered containing medicinal as well as spiritual virtues.

Cytisus.

"IT is probable that in Greece there was never any want of fodder in the Spring, their winters being short; and having the cytisus, which even in Italy was fit to be cut in the month of January *, and afforded plenty of food for all sorts of cattle, as goats, sheep, and oxen, fattened them soon, and produced good milk †. It was fed green nine months, and made good hay. What this cytisus was is a question not yet decided. Bodæus thinks it to be the Cytisus Maranthæ, which is a shrub, and however improbable this may seem, yet Pliny calls it a shrub. I do not always lay much stress on his testimony, for in the infinite variety of subjects which he handled, he has frequently made mistakes, as is well known. Yet in this case he would not easily be deceived, for he mentions it as cultivated in Italy, like lucern, and wonders it was not more in use. He says it was brought from the Island Cythnus, one of the Cyclades, and thence propagated in Greece and Italy. He adds, that it is not hurt either by heat or cold. It would be easy to determine the plant if thought necessary, by getting some sensible Captain of a ship, who trades to these parts, to make enquiry *."

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* Scrip. Geop. lib. 3. c. 1.

† Vid. Theophrastus, Ed. Bod. 506. Pliny and Columella.

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* There is no improbability in the use of a shrubby species for fodder, as the leaves and tender shoots of plants have in all ages been employed for that purpose. I am informed that the Spartium scoparium, an affinity of the Cytisus, is sown in Britanny to be mowed as fodder the second year; and with us a similar practice prevails in regard to the Ulex europæus, or common furze.

Theophrastus does not mention the Cytisus as a fodder, and therefore its use was probably a discovery posterior to his time. He describes two *cytisi:* the one a tree of moderate size, with wood of a greenish colour, as hard as ebony: the other a parasitical or climbing species, which is noxious to other plants; this may be the *medicago arborea:* but Clusin, for some reason which induced him on the spot, has inserted in his catalogue a *cytisus secundus*, a well-known species in our nurseries. St.

The Geoponic writers recommend cutting the Cytisus in January, at the same time as Lucern.

Dioscorides says it is a white shrub, like the Rhamnus, with branches a cubit long or longer, clothed with leaves like those of fenugreek, or birds-foot trefoil, only less, and having a larger rib. When they are rubbed with the fingers they smell like rocket, and have a taste like green chiches.

Columella speaks only of it as an excellent fodder, causing abundance of milk, and as being useful to hens and bees.

Pliny mentions, that Amphilochus wrote a whole book on the *Medica* (Lucern) and the *Cytisus*. He says it is a shrub, and greatly commended by Aristomachus the Athenian as a good fodder. He observes that it increases milk, is hoary, and has the appearance of a shrubby trefoil, with narrower leaves.

The classic reader will recollect that the Cytisus is frequently mentioned also both in Theocritus and Virgil, as a common and nutricious fodder.

Much investigation has been employed to ascertain this plant, and

Virgil's Georgics.

HIS taste for classical poetry, and his love of Virgil in particular, induced him to plan a minute commentary on the Georgics, which he justly considered as an improved compendium of Greek and Roman agriculture. He mentions, that the poet intermixed theory and practice, that he availed himself of the precepts laid down by Theophrastus, and that his accuracy and agricultural knowledge are no less conspicuous than his poetical merit. But of this commentary we find nothing more than a few slight and imperfect references.

Geoponic Writers.

ON the collection known under the name of the Geoponic Writers *, he has left a few but judicious remarks.

"Five books in twenty of the Geoponic Writers are taken up about vineyards, one on olives, three on

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it is supposed, with the greatest probability, to be the *Cytisus Maranthæ*, or the Medicago arborea of Linnæus. Of this plant the nutricious properties are well known, and the wood is so hard as to be employed by the Turks in making handles for sabres, and by the Monks of the East for their beads. (M.)

* The Auctores Geoponiκῶν. This curious work has been recently translated by the Rev. Mr. Owen, under the title of Geoponica.

gardening, three on insects, one on pigeons and poultry, one on bees, one on horses, one on oxen, one on sheep and goats, one on dogs and game, one on fishing, one on the prognostics of weather, and the rising and setting of the stars, one how to find springs, and to know the quality of the earth, dung, and things properly belonging to agriculture, and one on the Calendar out of Varro and the Quintilii.

"In this Collection are joined together good and bad, as it happens; the judicious precepts of Theophrastus and Varro, mixed with the nonsense of Zoroaster, as he is called, and of Sosion and Africanus. Whoever this Zoroaster was, he seems to have been the first who improved upon the Greek and Alexandrian Almanacks which foretold barely the weather, and set a pattern to our Wings and Partridges. For he not only took to himself a name of great celebrity, as some of ours do daily, but foretold diseases, deaths, famine; as "we must pray against war," "this year a great man will die," young men and women will suffer by sickness," "dangerous to women with child," &c. When we consider from what a natural and reasonable principle this nonsense took its rise, and how long it has prevailed, we are apt to be astonished on one hand at the impudence of some, and the credulity of others. But if we look over the history of mankind, we shall find too many instances of such cases to lay much stress upon this. The first almanacks of this sort were begun in a country where the seasons are tolerably regular; and as all country business was regulated chiefly by the rising and setting of the stars, astronomers having observed that rain, drought, storms, and other accidents of the weather, generally happened at the rising and setting of remarkable Constellations, they published their observations for the benefit of mankind; and this was the whole of the matter upon which Astrology, that chief of all monsters that have infected the human mind, was founded.

Pliny.

Mr. Stillingfleet does not appear to have highly rated the merits of Pliny, though he considers his work on Natural History * as a storehouse of Agricultural information, which would otherwise have been lost; but ill arranged, containing much useless and frivolous matter, and as to the best parts, drawn from Theophrastus. He observes it was first printed in 1468, and that no less than seven more editions made their appearance before 1500, and twelve in the course of the next century. He adds that as it was the earliest book on agriculture, and so often republished, it must with all its imperfections have produced great effect in reviving and improving husbandry; and with regard to England, it was evidently studied by our early agriculturists Fitzherbert and Tusser.

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* It was translated into the principal continental languages at an early period; but Holland first gave it an English dress in 1634.

PART II.

ENGLISH HUSBANDRY.

Remarks on the early Agricultural Writers — Tusser — Turner — Heresbach — Harrison — Lord Bacon. Utility of such writings.

THE second part of this interesting work was reserved for the History of Modern Agriculture. The number and variety of our author's references proved that he omitted no researches to ascertain the state of Husbandry in different quarters of the Globe; but the result of this laborious examination was not reduced to form.

The most prominent portion of this division relates to our Native Agriculture. He combats the opinions of those who represent the early Britons as totally ignorant of this art. He refers to the authority of Cæsar, that many of the British tribes had made some proficiency in agriculture; and he particularly notices the remark of Pliny that they had discovered the use of marl *.

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* See b. 17. c. 6, and 8.

The darker parts of our history afforded no clue to pursue the investigation till the time of Edward the Third, when the acts of the Legislature prove that it had occupied the attention of the government. Of these scanty but only materials now remaining, he has availed himself, and with considerable industry drawn out the heads of the different acts, passed for the encouragement of husbandry and the arts connected with it. As these notices, though dry and brief, are curious in themselves, we give them in a note *.

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* By 9 Edw. III. Aliens cannot carry wine out of the kingdom. (Query, what wine is here meant?) No foreign cloth to be worn, and liberty given to foreigners to settle in England. *Ibid.* By 25 Ed. III. Cloth imported may be sold any where in England.

By 12 Richard II. Those who have been brought up in husbandry till the age of twelve, shall abide at the same labour.

By 3 Henry VI. Sheep, either shorn or unshorn, not to be carried into Flanders. 6 Hen. VI. Corn not to be exported; 20 Henry VI. also if it does not exceed 6*s*. 8*d*. a quarter, and barley 3*s*. 23 Hen. VI. wages of a bailiff 23*s*. 4*d*. *per ann.* with clothing at 4*s*. and meat and drink. We may suppose that wheat was dear at 6*s*. 8*d*. a quarter, because after that price it might not be exported. Wheat is now reckoned dear at 40*s*. the quarter *, i. e. about seven times as much. Multiply 23*s*. 4*d*. the wages of a bailiff, and we shall have about 8*l*. *per annum* value, besides meat, drink, and clothing. A common husbandry servant by the Statute is to have 15*s*. *per ann.* besides clothing, this will be by the same way of reckoning, about 5*l*. *per annum*. By 26 Hen. VI. Goods from Holland, Zealand, and Brabant, prohibited.

3 Ed. IV. Wheat when not above 6*s*. 8*d*., Rye 4*s*., Barley 3*s*., not allowed to be imported. 7 Ed. IV. People of Devonshire allowed

* Mr. Stillingfleet made this remark about 1764, but now, in 1809, wheati reckoned dear at 100*s*. a quarter.

BIBLIOTHECA BODLEIANA

During the civil wars between the Houses of York and Lancaster, the minds of men were too much occupied in civil feuds, to regard any object beyond immediate subsistence; therefore many beneficial practices fell into disuse; and few or no improvements are traced till the establishment of a permanent government under the House of Tudor. At that time the introduction of printing produced the same beneficial effects in Husbandry, as in other arts. The writings of the antients

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to put flocks in cloth, by reason of the grossness and coarseness of their wool.

By 4 Henry VII. No man to farm above the value of ten marks yearly in the Isle of Wight, and in the county of Suffolk. All houses with 20 acres of land must be kept up. By 11 Hen. VII. wages settled much as by 23 Hen. VI. By 12 Hen. VII. the last act repealed.

By 3 Henry VIII. Repeal of an Act of 12 Richard II. about wages. 6 Hen. VIII. wages settled. 7 Hen. VIII. against letting fall, or pulling down houses used in husbandry. In the same year, with respect to houses also in towns. 23 Hen. VIII. Every one having 60 acres of arable land, and pasture apt for tillage, obliged to sow one rood with flax or hemp, or both. This Act not to extend to ground tilled only to clear it from moss. 24 Hen. VIII. against crows, choughs, and rooks. 27 Hen. VIII. No man to keep 2000 sheep. 27 Hen. VIII. against converting arable into pasture. 32 and 33 Hen. VIII. order decayed houses to be rebuilt in 59 great towns and cities. 33 Hen. VIII. Norfolk worsted made only of the wool of the county, and allowed to be exported.

2 Edw. VI. A tax on sheep and woollen cloths. 3 Edw. VI. Enforcing the Act for inclosing commons. Houses built on waste, with ground not exceeding 3 acres, not to be altered. 3 Ed. VI. Act for taxing sheep repealed. 5 Ed. VI. Obliging every town to keep in tillage as much land or more as has been ploughed for four years before.

were made known; and the Natural History of Pliny in particular, which is a storehouse of agricultural information, and first appeared as early as 1468, greatly contributed to revive and improve husbandry in every part

1 Philip and Mary, an Act against exporting wheat, rye, barley, and other corn, or small beer, butter, cheese, herrings, or wood. 2 Ph. and M. for rebuilding houses, and inclosing fields for tillage in Northumberland, Cumberland, Westmoreland, and Durham. 2 Ph. and M. every house having 20 acres of land belonging to it, to be kept up. *Ibid.* Every person having 120 sheep, shall have one milch cow, and breed one calf for 60 sheep, and every one keeping above 20 oxen, runts, scrubs, &c. shall keep one milch cow for every ten.

5 Elisabeth. Wages of labourers to be settled by justices. *Ibid.* One acre of hemp or flax to be sown. 8 El. Against exporting lambs and sheep. *Ibid.* An Act against rooks, crows, choughs and pies, stares, martens, hawks, furse, kite, mold kite, buzzard, shagge, cormorant, ringtail, osprey, woodwell, jay, raven, king's fisher, bull-finch, and every bird that devoureth fruit. 13 El. Grain of all sorts, and pulse may be exported paying such a duty. 31 El. No cottage to be erected without 4 acres freehold. 35 El. against erecting new houses in London and Westminster. Also against inclosing near London. 39 El. obliges owners of houses that have had 20 acres of land belonging to them to keep them far from houses, and in repair. 39 El. to keep up the same quantity of arable land as had been such 12 years before, and prohibit tilling it to pasture, Norfolk, Suffolk, and some other counties excepted.

By 3 Jac. I. Beer and malt exportable when barley at the port exceeds not 14*s.* per quarter, afterwards 16*s.* 4 Jac. I. Tenants in some parts of Herefordshire, allowed to enclose one third of their lands, meadow and pasture. By the preamble to this Act it appears that they used in that time to house their sheep all the year in Marden, Bodenham, Willington, Sutton St. Michael, Sutton St. Nicholas, Murton, Lug, and Pipe. 2 Jac. I. Liberty granted to take Sea sand for manure in Devonshire.

of Europe. In England this work formed our two earliest agricultural writers, Fitzherbert and Tusser.

Of Fitzherbert *, who is justly called the father of British Husbandry, Mr. Stillingfleet has left no notice, except the title of his work, and a few references; but he has expatiated more fully on some of his successors, particularly on Tusser, Turner, Harrison, and Lord Bacon.

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* Fitzherbert was a judge of the Common Pleas in the reign of Henry the Eighth, and one of our earliest agricultural writers. His work was stiled, "The Booke of Husbandrie," and was first printed about the year 1546. He was also author of the "Booke of Surveyinge, or Improvements." His writings excited a spirit of emulation among his countrymen. Many of our authors copied his works without acknowledging the obligation. Harte's Essay on the great Importance of Agriculture, p. 45. who observes, "One may say of Fitzherbert's Husbandry what Sir Philip Sidney applied to Chaucer's poetry: 'I marvel how in those misty times he could see so clearly, and how others in such clear times could go so blindly after him."

Tusser.

TUSSER, who flourished in the reign of Henry VIII. and Elizabeth, was a gentleman and practical farmer, and gave to the public the result of his labours and knowledge, in a whimsical Treatise in verse, intituled, "Five Hundred Points of Good Husbandry, united to as many of Good Housewifery *," &c. He wrote from practice, which appears, as well from the account of his life, as from his book on Husbandry; for he does not mention any of those articles which we see in some of the earliest treatises, as well as in later; namely, Cytisus, Lupines, Chiches, Sesamum, Fenugreek, none of which were perhaps then cultivated in this country; but described from Varro or Columella, or at second hand from Pliny.

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* Of Tusser's Five hundred points of good Husbandry Haller enumerates several editions in quarto, London, 1557. 1580. 1590. 1593. and in 1744, with notes and a commentary. Professor Martyn, in his list of authors on husbandry, mentions editions in quarto of 1562. 1573. 1580. 1586. 1592. 1597. 1604. 1638. 1651. 1672. and "Tusser Redivivus," published monthly, with a commentary, and reprinted 1744, in 8vo.

We here give the whole title-page to this singular work: "Five hundred points of good Husbandry, united to as many of good Housewiferie, and nowe lately augmented with divers approved lessons concerning Hopps and Gardening, and other needful Matters, together with an Abstract before every Moneth, containing the whole Effect of the sayd Moneth, with a Table and a Preface in the beginning, both necessary to be reade, for the better understanding of the Booke. Set forth by Thomas Tusser, Gentleman, Servant to the Honourable the Lord Pagett of Beudesert. Imprinted at London, in Flete-Street, within Temple-Barre, at the signe of the Hand and Starre, by Rychard Cottell, anno 1573."

After the table of contents is an epistle in verse, "To the Right Honourable and my special good Lord and Master, the Lord Paget of Beuderset." Then another to the late Lord William Pagett.

These, and the Husbandry, occupy 66 pages, or rather leaves, as they are numbered only on one side. Next come the points of Housewifery; and, lastly, the Author's Life, also in verse; both making 31 pages, or leaves. From the last we learn that he was born

Of linnage good, of gentle blood,
Whose pettygree who lists may see
In Harold's booke,
In Essex layer, in village fayer,
That Revenhall hyht.

That he was sent very young to school to learn music and singing, first at Wallingford, then at Powls, then at Aeton (Eton), and then to Trinity College, Cambridge. Afterwards he mentions his residence for ten years in Lord Paget's family in London, where music seems to have been his profession, according to his introductory epistle to his Patron.

My serving you I know it was enforced this come to passe;
Since being once at Cambridge taught,
Of court ten years I made assaye:
No music then was left untaught,
Such care I had to serve that way.
When joy 'gan slake, then made I change.
* * * * * * * *
My music since hath been the plough.
* * * * * * * *

He seems to have been a good-natured cheerful man, and though a lover of œconomy, far from meanness, as appears in many of his precepts, wherein he shews his disapprobation of that pitiful spirit, which makes farmers starve their cattle, their land, and every thing belonging to them; choosing rather to lose a pound, than spend a shilling. Upon the whole, his book displays all the qualities of a well-disposed man, as well as of an able farmer.

He wrote in the infancy of farming; and therefore I shall first give a full account, as far as relates to that part of farming which has been my principal object. I am the more inclined to adopt this method, as his precepts will be comprised in a narrow compass, and as a sort of justice due to him as an original writer. He throws his precepts into a calendar, and gives many good rules in general, both in relation to agriculture and œconomy; and had he not written in miserable hobbling and

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Or, as he says in his Life:

——— When court 'gan frown
Than took I wife, and led my life in Suffolk soyle.

He does not mention the place; but he afterwards went to Ipswich, where he lost his wife; thence to West Dyram, or Dyram Abbey, to Norwich, to Far Parsonage in Essex; and lastly returned to and commenced author in his old age, his

"Death drawing nere."

For this account of Tusser I am indebted to Mr. Jackson, Fellow of the Linnæan Society, who drew it, at my request, from an edition of this rare book, printed in 1576, in the valuable library of Sir Joseph Banks.

obscure verse, might have rendered more service to his countrymen. However, he must have been useful by diffusing over the kingdom that knowledge which he had gained by living in Suffolk and Essex, where farming was at that time best understood; for he observes, that inclosing was more common in those countries than elsewhere, and it is a certain truth that nothing more improves agricultural skill than inclosures; or rather, inclosing is the consequence of skill.

Calendar of Tusser.

January. Dung, sow peas, make quickset, gather browse for cattle, fill up holes in pasture, sow oats, break fallow, or lay, sow barley or oats upon lay.

February. Plough in stubble, sow rounceval peas, and beans, harrow in peas, peas and beans under furrow, dung pasture.

March. Sow white peas, shut in meadows, sow barley, harrow barley fine, roll barley, harrow oats, barley, and peas, after sowing; wheat under clods best, roll wheat.

April. In Cambridge and Lincolnshire in open lands they fallow in May. He advises to fallow in April, and spread dung.

May. Eat with sheep, weed corn, and sow buck, weed wheat and banks. Drain. Fallow land, dung, gather stones.

June. Mow, plough, cut bushes and brambles, clean ditches.

July. Make hay, and thrifallow on inclosed land.

August. Cut wheat, peas; keep from ploughing till Michaelmas. Carry dung, thresh for seed; dung.

September. Thresh and sow rye, sow white wheat; set children to fright away birds; mend banks *.

October. Lay up barley-land, dry, sow red wheat. Do not overdung. Account of different kinds of wheat. Oats, wheat, grass, barley, rye, impoverish. One crop after another bad. Peas and brank between do good. Three crops allowed on inclosed ground. A good fallow for barley, next peas, next wheat, then fallow or lay down. In open land, first rye, then barley, or wheat before barley; but in Middlesex, barley, wheat, then lay down, or dung and fallow or plough. Barley after rye or wheat, not unless on rich land. Beans and peas between rye or wheat and barley. Two crops of a fallow is well; one crop and a fallow tolerable. After peas, wheat without dung. New broken land, or wet, or over-dunged, not good for wheat. Wet land best for oats, grey peas, rouncevals, and tares.

In the calendar for this month Tusser takes up no less than 84 lines in his account of husbandry implements, and these lines consist of mere names tacked together with scarcely an epithet that is not necessary. He likewise recommends, like Hesiod, the farmer to provide himself with a double set of the most necessary implements, to prevent any suspension of his work by accident.

November. Thresh barley for malt, sow peas, hastings, rouncevals, at Candlemas. Thresh. N. B. The benefit of soot not known.

December. Give the cattle, first rye-straw, then wheat and peas, then oats; and, lastly, barley-straw. If you give hay they will not touch straw. Some use vetches instead of hay.

Observations on this Calendar.

I question whether breaking fallow in January, and sowing oats in February, would be now approved by any of our farmers. Tusser mentions nothing of marl, chalk, or lime, or mixture of soils; those great improvements in agriculture known to Theophrastus, and practised by other nations, particularly of marl [*], the use of which was known in England for many ages, but lost by the political madness of our ancestors. He says nothing also of turnips, clover, rape, rye-grass, or lucern, though known to Turner; nor of folding sheep. He seems, however, to have well understood the management of barley and wheat, for he reared both in places where they had never been sown before.

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[*] Markham says, observes Mr. Stillingfleet, that marling was much used in Kent in former times, as appears by innumerable marl-pits found there, dug out and spent, on which did grow trees of two or three hundred years old; and, by the mention made of marl in books of husbandry, written as early as the time of Edward the Second, or before. But a provision in the Forest Laws proves that marl was commonly used long before this period: "Unusquisque liber homo de cætero sine occasione faciat in bosco suo, vel in terrâ suâ *marleram*." Charta Forestæ. Cap. xii.

For Open Land.

The course of Husbandry, as far as I can comprehend it, is thus: A good fallow, wheat or rye, barley. But barley after wheat not right, unless on rich land; otherwise peas or beans should come between. In Middlesex, barley, wheat, then lay down, or dung, or fallow and plough, that is, two crops in three years, if they did not lay down. For how many years they laid down, he does not say, nor with what, though I suppose with hay-seeds; if so, it must be for several years, if they reaped any benefit from it. Two crops off a fallow, he says, is well; one, tolerable; that is, two crops in four years.

Inclosed Land.

A good fallow; barley, peas, or brank wheat, fallow; that is, three crops in four years.

Tusser mentions the disturbances in his time about inclosures, which he approves.

Much has been written on inclosures, both in this country and in others; and the question has excited a great diversity of opinion *. Some say that it depopulates a country, which is certain, if all or much was to be turned to grass; but this will depend on the nature of the soil inclosed. If it is rich, no doubt a prudent farmer will turn to grazing, as in Gloucestershire and Suffolk; otherwise to ploughing, in the Norfolk way; in which case inclosures, so far from diminishing the want of labourers, will increase work. For example, we see on the side of London towards the South, where all is inclosed, there is scarcely any pasture, unless near Chelsea, and the land produces a crop every year. On the other hand, Suttonfield, in Holderness, consisting of as rich land as any in the kingdom, lies fallow every other year; but even so it employs more hands than it would if turned to meadow. So that the question cannot be decided in the general and vague way in which it is treated, whether inclosing depopulates or not. There is a method too commonly practised in this kingdom, which does worse than depopulate, it makes provisions dear; this is to take a few crops from the downs, for the mean avarice of a little present profit, and, when they are no longer worth sowing, to leave them almost waste for twenty years.

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* The disturbances to which Tusser alludes arose in the reign of Edward the Sixth, when, after the dissolution of the monasteries much land was inclosed, and arable turned into pasture. To remedy this supposed grievance, the regent, in 1549, issued many severe proclamations against inclosures, with a view to conciliate the people; but the insurrections were not suppressed without much difficulty.

I must say, it is extremely wrong to lay ground waste for the sake of a few crops, either by ploughing or burning land, which needy landlords consent to, and hungry tenants advise. It is doing like the savages in North America, who, according to Charlevoix, either make no use of their rich lands, or run them out with maize.

Googe, in his preface to Heresbach, sets Fitzherbert and master Tusser on a level with Varro and Columella, and Palladius *; but I would rather compare Tusser to old Hesiod. They both wrote in the infancy of husbandry; both gave good general precepts, without entering into the detail, though Tusser has more of it than Hesiod; they both seem as desirous to improve the morals of their readers, as well as their farms, by recommending industry and œconomy; and, that which perhaps may be looked upon as the greatest resemblance, they both wrote in verse, probably for the same reason, namely, to propagate their doctrines more effectually.

But here the resemblance ends. The Greek was a very fine poet; the Englishman an unskilful versifier. However, there is something very pleasing in our countryman's lines now and then, though of the rustic

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* "Whose works, in my fancie, may, without any presumption, compare with any of the Varros, Columellas, or Palladios, of Rome." Googe, Pref. to Translation of Heresbach, p. 33.

kind; and sometimes his thoughts are aptly and concisely expressed *.

Turner.

TURNER † the herbalist, the contemporary of Tusser, was physician to the Duke of Somerset and Dean of

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* Reap well, scatter not, gather clean that is shorn,
Bind fast, shock apace, have an eye to thy corn,
Lode safe, carrie home, follow time being fair,
Gone just in the barn, it is out of despair.

† Dr. William Turner was a native of Morpeth in Northumberland, and finished his education at Pembroke College, Cambridge, where his name appears as a student in 1538. He applied himself to the study of medicine, and afterwards entered into holy orders. Having embraced the principles of the Reformers, he was persecuted, imprisoned, and exiled. During his banishment he enjoyed opportunities which he could not have found in England of acquiring medical and botanical knowledge, particularly at Basle, Strasburgh, and Cologne. He travelled also into Italy, obtained the degree of Doctor of Physic at Ferrara, and at Bologna attended the lectures on Dioscorides, read by Lucas Ghinus, who had formed a physic garden for the purpose of enabling his disciples to make practical observations. During this time our countryman seems to have been intimately acquainted with the celebrated Cæsalpinus, and the still more celebrated Conrad Gesner, who speaks in the highest terms of his learning aud knowledge. While abroad he practised physic, and was appointed physician to the sovereign of East Friesland.

At the accession of Edward the Sixth he returned to his native country, and, by the influence of his patron the Duke of Somerset, was made a Doctor of Physic by the University of Oxford. He also received a prebend of York, a canonry of Windsor, and the

Wells, and published his work in three parts; the first at London, in 1551; the second in 1562; and the third at Cologne, in 1568. In the preface he mentions the time which he had employed on the subject, and describes the extreme ignorance of his countrymen in this branch of Natural History. He wrote, he says, a Herbal in Latin thirty years before, in which were contained the Greek, Latin, and English names of many herbs and trees, though he could not learn one name in either

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deanry of Wells. During the bloody persecutions under Mary he was again driven into exile, but restored to all his preferments under Elizabeth.

The work to which he owes his celebrity is a new Herbal, or History of Plants, "wherein are contayned the names of herbes in Greeke, Latin, English, Dutch, Frenche, and in the Potecaries' and Herbaries' Latin; with the properties, degrees, and natural places of the same gathered. For Steven Meirdman. Lond. 1551." It was reprinted at Cologne in 1562, with the second part, and a "Book on the Bathes of England and Germany."

He is likewise mentioned as conversant in the Natural History of Fishes, and in Ornithology; on which subject he published a work, intituled, "Avium præcipuarum quarum apud Plinium et Aristotelem mentio, brevis Historia."

He did not neglect the duties of his sacred profession; but published many religious treatises in defence of the Reformation, and collated the translation of the Bible with the Hebrew, Greek, and Latin copies.

Dr. Pulteney, from whose sketches of English Botany this account is principally extracted, justifies the attention bestowed on him by Stillingfleet, by observing, that few succeeding herbalists pay due honour to his merit and learning, except Ray, who stiles him a man of solid erudition and judgment. V. I. ch. 5.

of those languages from any of the physicians of his time; and there was only one English Herbal * extant, "full of absurd cacographies, and falsely naming of herbs." He adds, that he composed this treatise before either Fuschsius †, Tragus ‡, or Matthiolus §, had published theirs.

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* He probably alludes to the Grete Herbal, published in 1516; for which see Pulteney's English Botany, vol. I. p. 46.

† Leonard Fuschsius, a native of Wembdingen, in the Upper Palatinate, was born in 1501. He studied at Heilbrou and Erfurth, and afterwards at Ingoldstadt, in the university of which place he was appointed Professor of Medicine. But, being soon obliged to quit that station on account of his attachment to the Protestant doctrines, he practised at Anspach, and died Professor of Anatomy at Tubingen in 1566. He published many works on Anatomy and Medicine; but that to which Turner alludes was, "De Historia Stirpium Commentarii insignes," with more than 1500 figures of plants, printed at Basle in 1542.

He is said to have left three MS volumes, "De Re Herbariâ," which have never been published. Niceron, Homnes illustres, tom. 18. Jocher, Gelehrten-Lexicon, art. Fuschs.

‡ Jerome Tragus, born in 1498, at Heidesbach, in the Palatinate. He was a priest and physician, resided at Hornbach, and died in 1554. He wrote "Dissertatio de Herbarum Nomenclaturis;" an Herbarium; Commentariorum de Stirpium Germaniæ Historia. Jocher, art. Tragus.

§ Peter-Andrew Matteolo, or Mattheolus, was born at Sienna, about 1500. He studied at Padua, made considerable proficiency in the antient languages, botany, medicine, and polite literature; and having taken his Doctor's degree in medicine, practised in his native city. He afterwards served Ferdinand Archduke of Austria and Sovereign of Tyrol, as first physician, and died of the plague at Trent, in 1577.

We find that he travelled in Germany and Italy, and at Bologna was the scholar of Lucas Ghinus*, who read lectures on Dioscorides, and from whom he learned the names of divers herbs before unknown to him. On his return he sent an account of these acquisitions to Fuschsius, who had recently published his Herbal, and corrected many errors in that book.

Turner also urges his claims to the prior knowledge of many things written by Fuschsius, Mattheolus, Tragus, and Dodonæus †; but while he confesses that he

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He wrote Commentaries on Dioscorides, with some elegance, but is charged with many errors. The Italian original of these Commentaries appeared at Venice in 1548, 4to. was reprinted in 1565, in folio, with figures, was translated into Latin by the author, and afterwards appeared in French. His patron, the Archduke Ferdinand, and the Electors of Saxony and Bavaria, contributed to the expences of this publication.

* Lucas Ghinus, a physician of eminence, born at Imola, taught botany first at Pisa, aud afterwards at Bologna, where he was primary professor of physic. He was celebrated at the muster of Anguellera and Cæsalpinus. He wrote several works on botanical subjects, but none were ever published. He flourished about the middle of the 16th century.

† Rambert Dodoens, or Dodonæus, born at Mechlin, June 29, 1518, was son of Denis Dodoens, a native of Friesland. He studied at Louvain, where he received the degree of M. D. in 1535; but he previously visited several universities of France, Germany, and Italy, and acquired considerable knowledge in medicine and botany. He acted as Physician to the Emperors Maximilian the Second and Rodolph the Second. Returning, however, to his native country in 1582 he accepted the Professorship of Medicine at Leyden, and died there March 1585, in his 68th year.

owed something to them, he contends that he taught the truths of certain plants which they either knew not or had falsely described. He intended to publish a book on the names of fishes; and he printed a work on birds, which is very scarce and much valued.

Turner was conversant with the writings of the antient agriculturists, and particularly studied Theophrastus and Dioscorides. He likewise possessed a knowledge of rural œconomy far beyond the scanty notices of the age in which he flourished.

He seems to have given the first English names to certain plants which are still used. He noticed several useful plants in his travels, which were either not known or little cultivated in England. Among these he particularly specifies carrots tamarisks spelt. He professes his ignorance * of the virtues of white and red

He was much esteemed by his contemporaries, as a man of universal learning and merit; but is now chiefly known for his botanical works, which are the more interesting as forming the foundation of our countrymen Lister and Gerarde's Herbals, and as being referred to by Linnæus, for the Illustration of European plants. He is frequently mentioned by Mr. Stillingfleet in his Memoranda.

His botanical works were collected in one volume by himself in 1583, under the title "Stirpium Historia pemptede sex." Niceron, Hommes Illustres, t. 34. Bibliotheca Belgica, t. 2. p. 1064. Pulteney's Eng. Botany, v. 1. p. 111.

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* He discovered his skill in Botany by acknowledging his ignorance of the real Sesamum, which the botanists of his and the succeeding age confounded with the Myagrum Sativum.

clover, but he mentions the horned clover as growing wild in Germany. He says millet was used in Germany and Italy to cram capons; that chiches, or chick-peas, were found here only in gardens, though common in those two countries. He saw the vine growing wild in Italy and Germany; and also noticed Hordeum hexasticum, which he calls Dutch barley. Ribes, or currants, he says, were not generally known among his countrymen; and he mentions some which he observed in gardens abroad, and also by the water-side at Clover in Somersetshire, in the possession of Master Horner*. Phalaris, or scurvy-grass, he says, was brought into England from Spain; but lentiles were cultivated in Cambridgeshire, and flax in the North, and yetches, or tare, were well known for fodder. Spinage was then recently in request; and hops first used in the time of Henry the Eighth. He adds, "The great round rape, called a *turnep*, groweth in very great plenty all over Germany, and more about London than in any other part of England." He mentions, that he saw two plane trees in England, and a grove of lindens, or limes, near Colchester. He speaks of pillotes, or naked-oats, as growing in Sussex: "It hath," he says, "no husk abiding upon it after that it is threshed, and is like oatmeal. This kind groweth in no other country that ever I could tell of, saving only in England; neither have I read, in any new or old author, of this kind. The men of the country say that they will not grow well in a fat ground; but in a barren ground, where no corn hath grown before *."

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* Probably Thomas Horner, Esq. son of Sir John Horner, Knight, and proprietor of Mells in Somersetshire. He lived under Elizabeth and James I.

Heresbach.

Mr. Stillingfleet drew many curious observations on native and foreign husbandry in the middle of the sixteenth century, from Heresbach †, a native of Cleves,

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* Herb. 1 P. p. 73.

† The work of Heresbach, to which Mr. Stillingfleet alludes, was intituled, "Rei Rusticæ libri quatuor universam Agriculturæ Disciplinam continentes," with a Compendium de Venatione, Aucupio, et Piscatione; Cologne and Spire, 1590. 1595. Heresbach may be justly classed among the most distinguished scholars of the age, and, from his knowledge of languages, was styled Polyglottus. Though a Catholic, he lived in the strictest intimacy with Melancthon and other Reformers; and, besides his agricultural works, published editions of Herodotus, Thucydides, and Strabo. He was also author of a sensible treatise on the Education of Princes and Civil Polity, and several writings on religious subjects, as well as a curious History of the Anabaptists, and the excesses of their chief Minister. He died in 1576, aged 67.—Niceron, Hommes Illustres.

The work of Heresbach on Husbandry was translated by Barnaby Googe, under the title of "Four Bookes of Husbandrie, collected by Conradus Heresbachius, Counsellor to the high and mighty Prince the Duke of Cleeve, containing the whole art and trade of Husbandrie, Gardening, Grassing, Planting, with the antiquities and commendations thereof." Black letter. 1578. 4to. In the epistle to the reader Googe observes, that although he had altered and increased the original work with his own reading and observadescended from a noble family, devoted to husbandry, and himself a practical farmer. He was born in 1508, at Heresbach, became preceptor to the son of his Sovereign, and was afterwards appointed ambassador to England. Here he had an opportunity of examining many operations of our national husbandry, and comparing them with those of his own country, and the adjacent parts of Germany.

"Turneps, he says, are sown in Germany, either in March, to become ripe about the 10th of June, or in July, or August, after the first ploughing, commonly upon the ground where rape, or winter-barley, has been newly removed. Buck-wheat, recently brought from Russia, and the Northern parts of Germany, common, used in fatting hogs, and serves for bread and drink. It is sown after rape. Millet delights in watery moorish ground, and is used by the Russians mixed with milk. Lucern he describes as not uncommon in Germany; but adds, that it should be given sparingly to cattle. Spurry, proper for sandy and gravelly soils, produces the best milk and butter in Germany. Wheat should be earliest carried in, if not full of weeds; oats, buck, and pulse, latest. Ashes kill moss in meadows; but the best remedy is the plough-share. After laying down, the water

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tions, joined with the experience of sundry his friends, he does not think it reason to take from the author the honour and glory of his own travel.

Professor Martyn's Introduction to Miller's Dictionary.

should not be suffered to remain on the ground, nor the cattle to come upon it till the second year. It should be grazed by sheep after it is mowed, and then it ought to be dry. Good meadow may always be had where there is a command of water, if it is dunged, kept clear of weeds, bushes, and stones, and the ant-hills levelled.

"He first sowed winter-barley, introduced spelt into his country, and recommends deep ploughing from his own experience. He gives good rules for making hay, namely, to cut the grass when it begins to deflower; also, for the management of meadows when under grass.

"It is remarkable that he says winter-barley is generally ripe in May in Cleves; that in Misina and Thuringia, they plough but once; that rape is sown in winter, and kidney-beans in October and November; that rye is sown later than wheat, even in February, and that wheat is reaped in June or July, after rye. It appears that the inoculation of trees was then recently known in his country. Sand, marl, lime, and ashes, were used for manure, and turf in the Ardennes, and several volcanic substances."

Errors.

That wheat *, near mount Ætna, returns a hundred fold. That wheat turns into rye. That barley requires a rich soil. He ranks millet among legumes, and says its seed is contained in a pod. He confounds rape and turnep, calling them by the same name. He talks of sesame, and supposes it to be that of the antients. He says the erivilia was called in France dorella; that lucern required a rich and succulent soil. He talks of ingrafting a pear or apple on a beech.

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* Theophrastus, p. 913, says, In Sicily the return is thirty fold; with us the highest is twenty-four, twenty a great crop, sixteen a good one. About Babylon the return is about fifty, even when the culture is bad, otherwise an hundred. According to Strabo (Paris edit. p. 620. 731) Wheat, in the plains of Susiana, a fertile province of Persia, returns an hundred fold, sometimes two hundred and fifty.

An ear of wheat at Woodmaston, in 1765, had twenty calixes, each calix four grains complete and one imperfect, which make eighty grains to a single stem. Others were like this.

Heresbach may be in some degree vindicated from the first of the errors here imputed to him. Mr. Martyn mentions a root of wheat grown in the parish where he resides, which threw out eighty-three ears, of which forty-three were five inches long. Shaw, in his Travels, says, it is common in Barbary, for a single grain to produce ten or fifteen stalks; that some grains which he sowed in the Physic Garden at Oxford threw out each of them fifty; that Muzeratty, one of the late Califs of Kemsan, brought with him to Algiers a root that yielded eighty; but that the prince of the Western Pilgrims sent to the Bashaw of Cairo one which yielded one hundred and twenty. Pliny mentions some which bore three or four hundred. Indeed, some of Mr. Stillingfleet's further remarks prove that nothing is more uncertain and variable than the produce of grain.

Omissions from deficient Husbandry.

“He says nothing about manuring with clay. He mentions nothing about saintfoin, or clover, or trefoils of any kind; nothing of folding sheep: and does not distinguish between inclosed and open fields.

Bad Husbandry.

“His course of Husbandry for a sandy soil is, two or three years. Fallow every third year; then dung and sow rye or buck wheat; then oats; and yet they had lime and marl by his own account.

“It appears, upon the whole, that the present, and, as it is supposed, the best method of farming, then practised in some counties in England, was not known in our author’s time in Flanders. For we cannot suppose he could be ignorant of what was practised in a neighbouring country, being very curious, a man of fortune, possessing all opportunities of being informed, and in such esteem for his skill that his book was much valued, and translated into English, and became, I believe, the index of farming in this kingdom for many years. He died in 1576.

We see, by Heresbachius, and other writers, that the benefit of turneps for cattle was not unknown, and even the true time of sowing them. But they had not yet found the cultivation of clover; and therefore could not have the course in use at present. It is likely that the first person who hit upon this course farmed in a sandy and light soil, where nourishing fodder is naturally very scarce. It being discovered, therefore, that turneps sown at Midsummer, remained good till the winter, here was a succedaneum for hay; it being likewise discovered that clover sown in the spring was so in-grown by barley or oats sown at the same time, that it only began to rise to any height till after harvest, and produced a fine crop next year; here appeared a succedaneum either for summer-food, or, by making hay of it, for winter-food. The next question was, in what state the ground would be left by these three crops and experience shewed, that if the clover was rightly managed wheat might follow; and then they might begin with turneps again, and so on. But experience has since proved, that when this course followed for many years, the crop of clover is poor and thin. The farmers of Norfolk and Suffolk have discovered a remedy which has escaped the farmers of other countries: they put in a crop of peas after the wheat, and then all goes well.

" We may remark, upon this occasion, that although what Xenophon says is true, namely, common sense will lead us a great way in farming, if we do but observe

Nature; yet the best way of farming must be the effect of ages, and that we come to it step by step, as in all other arts and sciences. I must observe farther, that as this course of husbandry was first discovered in a poor soil, so it is there most advantageous; though the success of it has tempted men to make use of it in the richest soils, with what prudence let them who follow another method, or rather, who have tried both methods, determine! It seems to me as wise as if a man should root out thriving oaks to plant abeles in the room; or to burn wood in a coal country by way of œconomy. Those who understand farming will know what I mean."

Harrison.

The next author whom Mr. Stillingfleet has noticed in his memoranda is William Harrison, chaplain to Sir William Brooke, Baron of Cobham; who wrote a description of Britain, which has not sufficiently occupied the attention of agricultural writers, because its principal object was geographical and historical. But in the midst of this mass of curious information he has interspersed many valuable hints on the state of society and the progress of horticulture and husbandry, in the early part of the reign of Elizabeth, the time when he wrote. According to the opinion of his age, the soil of England was more proper for feeding and grazing than corn; for not more than the fourth part was then cultivated for grain. Summer wheat and winter barley were little known except in parts of the North, particularly about Kendal, where it is called March wheat. He speaks, however, of the means of fertilising the land by composts, and marl, of which he observes, "But where our ground is not so good as we would wish, we have (if need be) sufficient help to cherish our ground withal, and to make it more fruitful. For, beside the compost that is carried out of the husbandmen's yards, ditches, ponds, and dovehouses, or from cities and great towns; we have with us a kind of white marl, which is of such great force that if it be cast over a piece of land but once in threescore years *, it shall not need any further composting. Hereof doth Pliny speak †."

"Plenty, as he justly observes, is increased by good cultivation; whereas, a short time before, a great compass yielded but a small profit, while the people lived chiefly on flesh and milk, and were idle and dissolute. He says also, that within the memory of men, wooden platters and spoons were in use, pewter being scarcely seen even in a good farmer's house, and every other mark of national poverty; but such had been the recent improvement, that four pounds of old rent had been increased to forty, fifty, or a hundred. The farmers had plenty of conveniences, and six or seven years

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* Pliny, from whom our author seems to have taken this exaggerated account, says eighty years, b. xvii. ch. 8.

† Lib. xvii. c. 6, 7, 8.

rent lying by them whereby to purchase a new lease. He complains, however, of the decay of hospitality, increase of rents, oppression of copyholders, and of usury brought in by the Jews. He says, that gentlemen had become graziers, butchers, and tanners, which, perhaps, affords the strongest proof that agriculture was rising in reputation.

"In the time of Edward the First, and in the three succeeding reigns, garden-stuff was very common in England. From the time of Henry the Fourth to Henry the Seventh and Eighth it was unknown or supposed more fit for hogs than for men. In the age of the author it became common again, such as melons, pompions, gourds, cucumbers, radishes, skerrets, parsnips, carrots, turneps, and all kinds of sallad-herbs.

"Of fruit he says: 'And even as it fareth with our gardens so doth it with our orchards, which were never furnished with so good fruit, nor with such variety, as at this present. For beside that we have most delicate apples, plumbs, pears, walnuts, filberds, &c. and those of sundry sorts, planted within forty years past, in comparison of which most of the old trees are nothing worth: so have we no less store of strange fruits; as apricots, almonds, peaches, figs, corne trees, in noblemen's orchards. I have seen capers, or auges, and lemons, and have heard of wild olives growing here, beside other strange trees brought from far, whose names I know not.' Speaking also of medicinal herbs, he informs us, that they had been recently much introduced from abroad, and that he had himself seen three or four hundred sorts in some gardens, of which, till within forty years, even the names were unknown.

"Saffron was brought into England in the time of Edward the Third; but not common till Richard the Second. Wood and madder antiently cultivated; and also rape for oil, but then abandoned. Hops, after being in common use, neglected, and then again brought into vogue. "And where," he asks, "are any better to be found? where any greater commodity to be raised by them? Only poles are accounted to be their greatest charge; but sith we have learned of late to sow ashen keys in ash-yards by themselves, that inconvenience in a short time will be redressed *."

"But the most important part of his information is relative to sheep, and deserves to be laid before the reader; because it ascertains a curious fact, namely, that the *breed of Spanish sheep*, now so eagerly sought after, was originally derived from England.

"Our sheep are very excellent, sith for sweetness of flesh they pass all other. And so much are our wools to be preferred before those of Milesia and other places, that if Jason had known the value of them that are bred and to be had in Britain, he would never have gone to Colchis to look for any there. For, as Dionysius Alexandrinus saith in his De Situ Orbis, it may by spinning be made comparable to the spider's web. What fools then are our countrymen in that they seek to bereave themselves of this commodity, by practising daily how to transfer the same to other nations, in carrying over their rams to others to breed and increase among them. The first example hereof was given under Edward the Fourth, who, not understanding the bottom of the suit of sundry traitorous merchants, that sought a present gain with the perpetual hindrance of their country, licensed *them to carry over certain numbers of them into Spain*, who, having licence but for a few, shipped very many; a thing commonly practised in other commodities also, whereby the Prince, and his land, are not seldom times defrauded. But such is our nature, and so blind are we indeed, that we see no inconvenience before we feel it; and, for a present gain, we regard not what damage may ensue to our posterity. Hereto some other man would add the desire we have to benefit other countries and to impeach our own. And it is so sure as God liveth that every trifle which cometh from beyond the sea, though it be not worth three pence, is more esteemed, than a continual commodity at home with us, which far exceedeth that value. In time past the use of this commodity consisted, for the most part, in cloth and woolsteds; but now, by means of strangers, succoured here from domestical persecution, the same hath been employed unto sundry other uses, as moskados, bays, vellures, grograms, &c. whereby the makers have reaped no small commodity. Certainly this kind of cattle is more cherished in England than standeth well with the commodity of the commons, or prosperity of divers towns, whereof some are wholly converted to their feeding; yet such a profitable sweetness is their fleece, such necessity in their flesh, and so great a benefit in their manuring a barren soil is their dung, that their superfluous numbers are the better borne withal. And there is not a husbandman, for now I speak not of our great sheep-masters, of whom some one man hath 20,000, but hath more or less of this cattle feeding on his fallows and short grounds, which yield the finer fleece, as Virgil (following Varro) well espied, Geor. 3, where he saith:

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* These remarks are principally taken from the Description of Britain, ch. xvii. and the Description of England, ch. xix.

> Si tibi lanicium curæ, primum aspera sylva,
> Lappæque tribulique absint; fuge pabula læta.
>
> Georg. 3. l. 384 *."

"Speaking of the rot, to which our sheep are so much subject, he justly attributes it, not to the water, which he considers as wholesome, but to the unseasonableness and moisture of our summer, and to "mildews, gossamer, rowty fogs, and rank grass."

Holinshed also gave a topographical description of Scotland, translated from Boethius, by Bellenden. From

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* Harrison's Description of England. Holinshed's Chronicle, p. 220.

this account Mr. Stillingfleet has selected a detached remark, which proves the desolate state of that country. "In Scotland the country abounds with red and fallow deer, roes, wild horses, and even wolves." Of the latter, although some authors suppose that they were exterminated in our island at an earlier period, the information is too circumstantial to be doubted. "The wolves," he says, "are most fierce and noisome to the herds and flocks in all parts of Scotland, saving in one parcel of Angus, called Glennor's Dale, where these beasts do no manner of hurt unto the domestical cattle, but prey only on the wild *."

Lord Bacon.

THE next and last writer who is noticed in the Memoranda is the celebrated Lord Bacon. In his treatise on Natural History Mr. Stillingfleet justly observes, he has scattered numerous precepts and hints which exhibit his characteristic sagacity and judgment, though mixed with many notions which have been since exploded; and, however imperfect, led the way to many subsequent improvements.

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* According to Pennant, the breed of wolves was not extinct to 1680, when the last fell by the hand of the famous Sir Ewin Cameron. Pennant's Quadrupeds, vol. I. p. 75.

In Ireland, according to the same author, the race was not extinct till 1710. Ib. p. 77.

" He touches on the modes of hastening germination. These are by a hot-bed, for which he gives such directions as prove that its use was then little known. "There were sown in a bed turnep-seed, radish-seed, wheat, cucumber-seed, and peas. The bed we call a hot-bed, and the manner of it is this. There was taken horse-dung, old and well rotted; this was laid on a bank half a foot high, and supported about with planks, and on the top was cast sifted earth some two fingers deep, and then the seed sprinkled in it, having been steeped all night in water mixed with cow-dung. The turnep-seed and the wheat came up half an inch above ground within two days after without any watering. The rest the third day. The experiment was made in October; and it may be in the Spring the accelerating would have been the speedier. This is a noble experiment; for without this help they would have been four times as long in raising up. But there doth not occur to me at this present any use thereof for profit, except it should be for sowing peas, which have their price very much increased by the early sowing. It may be tried also on cherries, strawberries, and other fruit, which are dearest when they come early *."

" As another principal mode of hastening germination he recommends the steeping of seeds in different menstrua. Wheat in urine, in water, alone or mixed with the dung of animals, with chalk, soot or ashes, bay-

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* Nat. Hist. Cent. 5. § 401.

salt, and even in claret, malmsey, and spirit of wine. He mentions the result of different experiments, which proved the superior advantage of the animal matter; and he suggests others on different subjects, and at different seasons.

"He then describes the nature and properties of different kinds of manure, under which denomination he comprises: 1. "The dung of animals, of which he says that of sheep is the best; next that of kine; thirdly of horses, though too hot unless mingled. He recommends the dung of pigeons for a garden, or small piece of ground. 2. Different species of earths. Marl is the best, as being rich without too much heat; the next sea-sand *, of which the principal virtue lies in the salt, "the first rudiment of life;" chalk, which is fit both for arable and pasture, after being rendered friable by exposure †; earth, particularly if charged with saltpetre and mud. 3. Ashes, especially those of vine-cuttings. On this head he remarks, that the districts of Ætna and Vesuvius, receive some compensation for the mischiefs derived from the eruptions by the excessive fertility of the soil occasioned by ashes. Also soot and salt. 4. Putrified vegetable substances, particularly stubble. Under this head he likewise recommends

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* Also sea-weed, 447.

† It was the common opinion of farmers in his time that chalk was fit for arable land, and not for pasture, which he here contradicts.

leaves of trees, mixed with chalk and dung, as a profitable compost.

5. Heat and warmth. 1. By burning vegetables; 2. By walls and inclosures; 3. By aspect; 4. By folding sheep; 5. By covering the ground with brakes in the beginning of winter. Lastly, he observes that flints and stones contribute to keep the ground warm, and therefore their removal, when not too thick, is detrimental. 6. By watering and irrigation; under which head he gives the rules observed in the present improved state of our water-meadows. This article deserves to be repeated in his own words:

'Watering or irrigation is in two manners; the one by letting in and shutting out waters at seasonable times; for water at some seasons, and with reasonable stay, doth good; but at some other seasons, and with too long stay, doth hurt; and this serveth only for meadows that are along some river. The other way is, to bring water from some hanging grounds, where there are springs, into the lower grounds, carrying it in some long furrows, and from those furrows drawing it traverse to spread the water. And this maketh an excellent improvement both for corn and grass. It is the richer if those hanging grounds be fruitful, because it washeth off some of the fatness of the earth, but howsoever it profiteth much. Generally when there are great overflows, in fens, or the like, the drowning of them in the winter maketh the summer following more fruitful; the cause may be, that it keepeth the ground warm, and nourisheth it. But the fen-men hold that the sewers must be kept so, as the water may not stay too long in the spring till the weeds and sedge be grown up, for then the ground will be like a wood, which keepeth out the sun, and so containeth the wet, whereby it will never graze to purpose that year.' Cent. 6. Sect. 600. He also mentions, that salt, sea-weed, wine, and blood, may be applied to the roots of trees with advantage.

He then details different expedients for hastening the ripening of fruit by means of heat and shelter, and mentions their effect on grapes. He recommends digging about the roots of trees, and transplanting of herbs, as the means of promoting their growth; the first of which methods was in his time only practised on the vine. He likewise examines some methods of retarding germination and improving fruit by clipping the tops, particularly of the fig, pulling off buds, removing plants, laying bare the roots, binding the stem, and planting under a shelter. Cent. 5. Sect. 413—476.

After briefly touching, though somewhat inaccurately, on the three modes of grafting vines, practised by the antients, he besides relates a curious fact, mentioned by Theophrastus: 'Dust helpeth the fruitfulness of trees, and of vines by name, insomuch as they cast dust upon them of purpose. They note, that countries where the fields or ways are dusty bear the best vines *.'

He observes, that the same seed sown on the same ground will greatly deteriorate. He afterwards expatiates on the diseases of corn, and proposes some, though he candidly confesses ineffectual, remedies.

He has collected some curious observations relative to the nature of soils, and the habits of certain plants: 'The putting forth of certain herbs,' he says, 'discovereth of what nature the ground where they put forth is; as, wild thyme sheweth good feeding ground for cattle; betony and strawberries shew grounds fit for wood; camomile sheweth mellow grounds fit for wheat; mustard-seed

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* The covering of grapes with dust is called by Theophrastus *υποκονισις*. The process occurs in book iii. de Causis Plantarum. He says, however, that it should not be practised early, when the grapes begin to change colour; but only when they are nearly ripe, because it hinders the maturation, *οργην πεψεως*. The practice, he adds, obtained equally with respect to cucumbers; and, he says, "the effect of their being thus improved may arise from many causes: that nourishment might be given out from the earth thus stirred in the form of a moist air, as happens in the case of vaporous exhalations; and likewise to be a defence against the too great heat of the sun."

This is a very philosophical account of the matter, and it seems probable that this *υποκονισις*, as we may judge from the force of the preposition *υπο*, was not sprinkling, or covering with dust, but that the fruit-branches in their vineyards were laid under and covered with the dusty soil, in the same manner as the cucumbers undoubtedly were. (S.)

growing after the plough sheweth a good strong ground also for wheat; burnet sheweth good meadow, and the like. Cent. 7. Sect. 660.

The differences of Earths.

The differences of earths, he adds, and the trial of them, are worthy to be diligently inquired. The earth that with showers doth easiliest soften, is commended; and yet some earth of that kind will be very dry and hard before the showers. The earth that casteth up from the plough a great clod is not so good as that which casteth up a smaller clod. The earth that putteth forth moss easily, and may be called mouldy, is not good. The earth that smelleth well upon the digging or ploughing, is commended, as containing the juice of vegetables almost already prepared. It is thought by some that the ends of low rainbows, fall more upon one kind of earth than upon another, as it may well be, for that earth is most roscid, and therefore it is commended for a sign of good earth. The poorness of the herbs, it is plain, shews the poorness of the earth; and especially if they be in colour more dark; but if the herbs shew withered, or blasted at the top, it sheweth the earth to be very cold; and so doth the mossiness of trees. The earth, whereof the grass is soon parched with the sun, is commonly forced earth, and barren in its own nature. The tender, chessome, and mellow earth is the best, being mere mould, between the two extremes of clay and sand, especially if it be not loamy and binding. The earth that after rain will scarce be ploughed is commonly fruitful, for it is cleaving and full of juice *.

The coming of trees and plants in certain regions and not in others, is sometimes casual; for many have been translated and prospered well, as damask roses, that have not been known in England above an hundred years, and are now so common. But the liking of plants in certain soils, more than in others, is merely natural: as the fir and pine love the mountains; the poplar, willow, sallow, and alder love rivers and moist places; the ash loveth coppices, but is best in standards alone; juniper loveth chalk, and so do most fruit trees; samphire groweth but upon rocks; reeds and osiers grow where they are washed with water; the vine loveth sides of hills turning upon the South East Sun †.

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* Cent. 7. Sect. 665.

† Cent. 7. Sect. 669.

Errors.

Before I take my leave of Lord Bacon, I must make a few observations that occur upon reading his Natural History. He proposes to graft a peach on a cherry, and supposes that the scion overcomes the stock, to which advice we owe much bad fruit. He imagined that honey dew was derived from the air. He believed the transmutation of insects to arise from corruption, and on the same principle accounts for the transmutation of plants, which he not only supposed would degenerate, but change into others of a different kind. He thought that misletoe was a superfœtation, and that there were plants without a root. He doubted whether nature might not put forth plants without seed. He believed that fruit trees cannot have flowers and fruit at the same time in cold countries; that there were plants bearing no flower, yet producing fruit, &c. and he brings his instances from trees commonly known, and bearing both flowers and fruit.

I give not this list of errors by way of triumph, but as a lesson to teach us humility. When we consider the extraordinary parts and curiosity of this great man, his caution in admitting nothing as true without experiment or examination, and his peculiar ability in making experiments, what shall we say when we behold such a man falling into errors; some of them, indeed, long before adopted by philosophers of reputation, but all of them directly contrary to our simple and first conceptions? we must acknowledge that even ingenuity itself will often render the human mind liable to mistakes of its own growth; and that the mos tsublime genius will not always be able to root out those which others have planted.

We are apt to think that every truth which is commonly known was easy to discover, and that we should have escaped those errors which seduced the most acute men of all ages and countries. This belief hinders us from setting a due value on the blessings we enjoy in all the greatest and most essential points of life *."

Mr. Stillingfleet concludes his review of our Agricultural Writers with these sensible remarks.

"By the extracts I have given, it is easy to judge how greatly Agriculture has been indebted to men of learned education, even such as are not practical farmers. I look upon this to have been the case of Theophrastus; yet in his books are contained all the essential principles of til-

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* These remarks on Lord Bacon are little more than mere references to a few passages in his Natural History, a book which, notwithstanding its errors and defects, contains a vast fund of practical information, and useful hints for the husbandman and horticulturist. Had Mr. Stillingfleet completed his plan, he would have given that attention to Lord Bacon which he so highly deserved; and would particularly have endeavoured to trace the ideas which our sagacious countryman drew from Theophrastus and Pliny, as appears by numerous allusions and references scattered through his manuscript collections.

lage; and if we attribute the least merit possible to him, by supposing that he only delivers what was generally known and practised in his time; yet still supporting those methods of practice by strong and solid reason, was something more than matter of mere philosophical curiosity, as it not only explained the common phænomena, but also furnished hints for producing effects of a similar nature.

This consequence will always happen when we set out upon right principles, and ever has and ever will be the touchstone to distinguish true from false philosophy. Theophrastus, Galileo, Sir Isaac Newton, and Hales, have given rise to many useful discoveries that were not the objects of their enquiries.

But if what I have mentioned concerning Theophrastus should not be allowed, he has still a merit of another kind, which cannot be disputed. He certainly propagated the Greek method of farming in other nations, and was in that respect of infinite service, not only in those days, but at the revival of learning. It is true, Pliny was the author then chiefly read. But what is Pliny? is he not Theophrastus in Latin? mangled it is true, and disfigured in many places, but still retaining most of the essential principles of agriculture. I know the trite objection upon this subject, which arises merely from ignorance of facts, joined to a superficial theory, viz. that the farming in Greece and Italy will not suit other climates. Let us consider this specious pretence. Are not then lime, and chalk, and dung of animals good upon grounds here and every where, as well as in Greece and

Italy? I believe they are universally considered so now, though there was a time when dung was thought in England to spoil land, and this notion prevailed chiefly about London. Again, is not ploughing as good here as in Greece and Italy, and for the same purposes? viz. to turn up the ground to the sun and frost, destroy weeds, &c. and if for these purposes, then the times of ploughing settled by the Greeks are by the same rules settled for us: for if the weeds in Greece which ripen their seeds in April ripen them here in June, it is evident at what time in each country the land ought to be turned. It will be said that though Hesiod directs to sow in November, that month is not the properest in this country for such a purpose. But let it be also observed, that when he says sow in temperate weather, he has marked out a season equally proper for northern climates as for Greece. For temperate weather in Autumn generally happens in September and part of October. However, November is not excluded. It would be tedious to shew in most particulars how the same precepts suit very different climates, when explained not literally, but according to the dictates of common sense. The great and almost only difference in farming between the Northern and Southern countries arises from the different times of harvest. In Greece, the harvest is in May. This gave the farmers then an opportunity of preparing their ground for a Midsummer crop, which was reaped time enough for Autumn sowing, so that if they had sufficient manure, they might have two crops in the year; whereas our harvest being in August, allows no time for another crop the same year though the ground be ever so rich. When we consider that in Egypt the harvest-month is April, in Greece is May, in Italy is June, in some parts of France July, in England and other countries is August and September, and reflect that there is a difference of six months, it is surprising that in all these countries wheat and rye ought to be sown nearly at the same time. Some of the less rigorous climates, indeed, yielded Spring-barley, but Spring-wheat and Spring-rye were the produce of much colder regions. Again, tares, peas, beans, were sown at the same time as with us, viz. in the Spring chiefly; and turneps and rape are sown at Midsummer, in Italy as in England.

All these circumstances are evident proofs that the difference of climate makes less variation in farming necessary than is generally imagined. But ignorance, obstinacy, and self-conceit, induce men to hold another language. They do not know that land in the same country often requires a more different way of cultivation than some lands at the distance of many thousand miles. Thus, perhaps, Norfolk-farmers would succeed better in Africa than in Herefordshire. Nay, this sometimes may happen in the next parish; and herein the practical farmer has an advantage gained by mere experience which no book can furnish. But will any one, therefore, say that reading is useless, because no author can possibly enter into a minute detail of all the various particulars that constitute the difference between two pieces of land separated, perhaps, only by a hedge. To assert this is to make no difference between a man who has reason to guide him, as well as his senses, and a brute who has only the latter. People accustomed to this way of thinking will be surprised when they are told that planting in pots, covering plants with straw, hot beds, and hot houses, should be invented in Greece and Italy. But a little reflection may, perhaps, check their surprize; for Greece is cold compared with Egypt, and Italy compared with Greece, just as England is if compared with Italy; so that the same method of cultivating plants that come from a more Southern climate may be proper and necessary in Greece, Italy, and England; and even the same plants sometimes; thus the citron must be treated in the same way in those different countries.

Other considerations also shew the benefit which gentlemen and men of learning have conferred on society by writing on Agriculture. Who but they brought into these parts of the world all the plants now commonly cultivated? Did the common farmer travel abroad in search of them? or when the seeds were put into his hands, and propagated by him with success, did he spread his knowledge over the nation? Nobody will say this is the case? Who gave descriptions of the plants used in husbandry, so that others, when they heard of their use, might know them? Not the farmer, most assuredly. For this necessary part of knowledge we are indebted to the professors of botany. Turner tells us, that when he first wrote, scarcely the names of any plants were known in this kingdom. He studied under Lucas Ghinus, Professor of Botany at Bologna; and Cæsalpinus * was also a disciple of the same master. From this time, natural knowledge began to rise and spread over Europe. Lucas Ghinus lived before any considerable book on farming had been published after the revival of learning. From that time, many works were published which have been of the greatest service to the farmer; so we may and ought to look up to the academy at Bologna as the most noble and useful institution which has ever existed."

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* Cæsalpinus, who is so often mentioned in these fragments, was born at Arezzo, in 1519. From an early period he devoted himself to the study of Natural History, and imbibed from Lucas Ghinus those scientific principles which he afterwards so much improved and extended. He died in 1603, aged 84.

He published numerous works on medical and metaphysical subjects; but he is here noticed as author of a work de Plantis, lib. xvi. Florence, 1583. 4to. He left an Herbarium, containing no less than 768 species.

PRACTICAL AGRICULTURE.

ȣ γνωσις αλλα ϖραξις. ARISTOTLE.
Not theory, but experience.

Maxims in farming — Georgics of the mind — Improvement of land --- Watering --- Fences, and particularly the bramble --- Willows --- Pillas, or naked oats --- Sheep.

AFTER having traced the rise and progress of Husbandry from the most early period in every country of the habitable globe, and taken a survey of our native agriculture, Mr. Stillingfleet purposed to descend from theory to practice, and give a detail of husbandry as conducted in his time, recommending such improvements as his own scientific and experimental knowledge suggested.

The Memoranda for this portion of the work were never arranged nor completed; but are scattered through his common-place books, and appear to consist of letters and oral communications from farmers of all ranks and descriptions, and even from shepherds, bailiffs, and labourers of different gentlemen; extracts from various authors, and numerous experiments and observations of his own. These remarks are in general unconnected, and too imperfect for publication; some have been anticipated, and others are introduced in the treatise on grasses; a few are here added as tending to display the design of the author.

Maxims in Farming.

"WORK that is done for many years ought to be done with more care and expence than what is done for a year or two. The contrary of this is usually practised by farmers, who, in laying down land to grass, first starve it, and then take no care to get good seeds, both of which they avoid for a crop of wheat or other corn.

That method of managing land is cheapest which makes the best return; not that which costs least.

The best cattle are those which suit the soil, whether small or great; the same holds good with crops and trees.

Frequent returns, with small profit, are often better than one with great. Thus it is better to sell at a moderate rate than to wait for a dear season.

Never do things in a slovenly way at first with a view of having recourse to a remedy afterwards, if necessary. Thus drain well; fence well; and clean your ground well.

Never think of a remedy where you ought not to have a disease. This rule is nearly similar to the last; but there are some cases where this takes place and not the other: thus, do not look out for a crop which will grow on a bog; but drain the land, if possible.

Be always a little too early rather than too late in any work, especially if the season invites. Thus, be among the first to sow, to mow, to reap, to plant. Remember the common proverb: "Make hay while the sun shines," and do not, like many, act as if you thought the sun would shine when you chose. This maxim deserves farther observation. Early sowing seldom fails; late, frequently; and, by delay, the season is sometimes lost. Early mowing has these advantages. Your hay is better and more nourishing, and therefore is more profitable than a larger crop which is inferior in quality. You enjoy fine weather, and incur less risk of having your hay spoiled. Your two harvests do not interfere with each other to the hurt of one. Your aftermath is better, and makes amends for the less quantity of hay. Lastly, early reaping saves your corn from being spoiled by wet weather; for I suppose corn not thoroughly ripe is less apt to give, and will ripen full as well in the husk when cut as standing. I have had many proofs of this in other seeds which seemed near ripe on gathering; but by remaining in the seed-vessel grew perfectly well when sown. One advantage attending early cutting, especially oats, is, that a great deal of grain is saved which would otherwise be lost. I have seen fields, after harvest, covered so thoroughly with the scattered seeds, that they appeared as if sown for a crop.

Do not keep too large a farm. If you do, you will be like a slave to a hard master, who scarcely allows him bread. Many farmers are in this condition; they bestow as much or more cost and pains upon one hundred acres to little purpose, as would enrich them if bestowed upon a few. I have seen cases of this sort where the farmer was starving, but would have thriven if great part of his land had been taken away, though he had paid the same price for the remainder as he did for the whole. Here that maxim of Hesiod takes place, as upon many other occasions: "The half is more than the whole *." But ambition blinds farmers as well as princes; and though they cannot manage a little as they ought, yet they are still grasping at more.

Never use ordinary fodder when you can get good, as the latter cannot always be had even after the utmost foresight. But for the Spring sow an ordinary sort, which is not likely to fail. Farmers too commonly act contrary to each part of this maxim; for they are too often content themselves with bad hay and bad pasture when they can procure good. Again, they are as apt to presume that the seasons will always be favourable, and to make no provision for a bad one.

* πλὲον ἥμισυ παντος.

"Do men gather grapes of thorns, or figs of thistles?" says our Saviour *. Some men act as if they could do so. Compare two men: one industrious, sober, methodical, using the plough sufficiently, dunging, weeding diligently, fencing, and exercising only a common and ordinary way of husbandry, with wheat, rye, barley, oats, peas, beans, pasture and meadow; the other having, besides all these, turneps, clover, saintfoin, lucern, rape, vetches, and being perfectly acquainted with the culture of them; but neglecting to plough at the right time, or enough, omitting to dung and to weed, being indolent, drunken, irregular. Which of the two will thrive most? Is it not evident to common sense, and common observation, that the first must succeed, and the latter fail?

Steward, or Bailiff.

Procure, if you can, a man of sense and honesty for a Steward, or Bailiff; without such a one nothing can be done. He must be rigorous in tying down the tenant to proper terms; and have, at the same time, the greatest regard for his welfare. The generality of stewards try to pay court to the landlord, by increasing the rent-roll, and getting as much present money as possible by real oppression, and so ruin one and hurt the other.

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* Matt. chap. vii. ver. 16.

Never employ a steward who has much business of another sort; for in that case he is not likely to understand farming.

A practical farmer of genius sees improvements of various kinds that would never enter into the head of another man. Men, even the most docile, must be led like children, step by step. Nothing but experience can shew the difficulty of turning them out of the common road. It is not enough to point out a better, and even convince them it is so. Things must be repeated over and over without end, and every opportunity seized of giving them ocular demonstration. At Waghen the farmers were led into some kinds of improvement; they grew rich by it, and of course had acquired a high idea of their instructors; and this after many years experience. Yet no sooner was a new method practised with great advantage in other parts of the kingdom, than they shewed great reluctance to adopt it. They started objections without end; for ignorance is very expert in this kind of knowledge; and, among the rest, that which is always at hand when people are pressed upon these occasions, that it might do in other places, but would not do there; and, when all objections were answered, they plainly said they were afraid of being ridiculed.

Georgics of the Mind.

THERE is a kind of Georgics which far surpasses what has hitherto employed my pen. It is what Lord Bacon calls the Georgics of the mind; without which the other kind can but poorly or scarcely subsist. We may soon trace the want of one by the want of the other. When we see land producing lean and miserable crops, the fields overrun with weeds, the fences out of repair, meadows covered with briars and brambles, or rotten with stagnant water, &c. there is something wrong in the mind, either of the owner or the tenant; and from thence arises the want of due cultivation. Poverty is not a sufficient excuse; for either the landlord requires too great a rent, and does not do his part; or else the tenant, from folly or pride, or some other wrong motive, undertakes what is above his purse or skill, or is extravagant, drunken, litigious, or idle. It were easy, even if we had not a better guide, to point out from those noble remains of the Greek philosophy a remedy for these defects, and shew how œconomy, regularity, temperance, sobriety, would, if followed, effectually and necessarily produce the greatest happiness which this world can afford. But, alas! it is not enough to shew, or even to demonstrate this truth; something more is necessary. We must begin, from the earliest time of life, to inculcate the love of virtue, both by precept and example, as well as by proper rewards and punishments; all of which can come only from gentlemen, and those residing upon their own estates. And how shall this be brought about? Is any man magician enough to conjure the gay, the ambitious, the vain colony that yearly frequent the capital, down to their lonely, sober habitations, which are their proper spheres, and where alone they can live to any rational purpose, or, indeed, without doing hurt to themselves and others?

Improvement of Land.

IN regard to the expence of improving land, let us consider it thus: You have an acre worth ten shillings a year: you lay out ten pounds upon it, and make it worth twenty shillings. This is the same as if you bought land at twenty years' purchase, which any one would gladly do. If you lay out fifteen pounds, and increase the value as before, you only then buy land at thirty years' purchase. In many places the value of land may be doubled by making proper inclosures, by throwing down improper ones, by draining, and clearing away rubbish; and therefore it must be prudent to do it.

But I will go still further, and shew, that it may be worth while to pay more than thirty years' purchase in this way of improvement, even where beauty, health, and convenience, are out of the question. For, first, the same inclosures for your land serve as before. Secondly, the land-tax remains the same. Thirdly, supposing the land to be meadow, you pay nearly the same for mowing. Fourthly, your hay lies in a less compass, and therefore is sooner loaded and carried; and if it is arable you use less seed; not only because you have less ground to sow, but because rich ground requires less seed than poor.

An intelligent farmer told me, that, from the experience of several years, he had gained forty *per cent.* for every shilling expended in improvement.

I saw likewise an instance of land in Scotland, near Dumfries, that was overrun with furze, let for only £ 16. year. The farmer burnt the furze, and then stubbed and marled, and, in thirteen years, the same farm let for £ 100. a year. The farmer, when he went in, was not worth above £ 50. and, when he went out, he was worth £ 1,200.

Watering.

THE Spaniards water their ground more, perhaps, than any other people in Europe, especially in those parts where the Moors were settled, from whom they, perhaps, derived it. The Moors probably learned this practice from the Ægyptians and Persians; and from the Spaniards, in all probability, the rest of Europe drew the idea of flooding.

In Valentia the natives obstruct the rivers at the foot of the mountains, and divide them into channels. They separate their fields into horizontal portions, surround these with banks, and let the water lie on them seven or eight days, after a crop; and then sow. They proceed with several successive crops without manure. In the kingdom of Grenada, where the Moors were last settled, this method is best observed.

Pocock mentions several places in the East where water is raised at a great expence in order to flood the fields. We learn also, from Shaw's Travels, that the Moors water their grounds; and that in the plains of Midly there are artificial drains cut to water the lands, so that the whole country is like a garden.

Fences.

THEOPHRASTUS does not, in my recollection, mention a word about plants proper for fences [*]. Did the Greeks use other fences? Or can we imagine that they used none? He is so very particular about the use of every kind of tree, that he was not likely to have omitted a subject so essential if live fences were employed. We have carried this article to a great degree of perfection; but there is still something wanting to complete it. Every good farmer can raise a live fence upon almost any soil at first inclosing, if he will be at the requisite expence and care; but when it becomes old, and decays, under the shade and drip of trees, what remedy has he but a dead fence, which, besides wanting constant repairs, lays such a temptation in the way of poor cottagers, that it is almost sure to be plucked up for firing. The only remedy I know is sowing blackberry seeds, which will grow well in the thickest shade. As the plants come up I would recommend fixing stakes on the bank, interweaving the branches betwixt them, and binding them at the top.

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[*] The word *αἱμασια*, *sepes*, occurs once in Theophrastus, and clearly shews that fences were then known. Speaking of the creeping roots of *ἑρπυλλος* *serpyllum*, *Linn.* he says it spreads prodigiously, if it lays hold of the sides of a trench, or is planted on the mound of a hedge. It is to be observed, that the *αἱμασια* was supposed to be a mound of earth and loose stones, planted with thorns, which by scratching the hands and feet of those who attempted to break them, and drawing *blood*, *αιμα*, had its name. Hesychius. (S.)

I know there are apparently strong objections to this. 1. That the brambles will spread over the ground. 2. That when sheep go near such a hedge it will catch and greatly hurt, if not sometimes destroy them, when help is not at hand.

But there is one answer to both these objections, though it will not, perhaps, satisfy the niggardly tenant, who grudges the expence of labour when it is possible to avoid it. The answer, however, is, that this hedge may be cut once or twice a year, as is customary to do by common live hedges in many places where farmers choose to pleach and keep them low. Besides, it is a rare thing to see fences without brambles; they seem stationed there by Providence, to shew for what purpose they were intended. They bear fruit that is pleasing enough to draw the country people and children, who are not used to delicacies, to eat them; and, as if that were not sufficient to raise our attention, they are continually catching those who approach too near by their clothes, goading them in the flesh, and even laying snares for their feet if neglected, in short, doing every thing to shew their end, all but saying, "Do you not see we were made to fence your ground?" Surely all these circumstances should be sufficient to rouse us, and make us consider whether they might not be turned to this use. Yet hitherto they have been neglected; and only looked upon as a curse upon the ground, as they are called in Scripture: and so they are to those who do not love to labour for themselves, according to the original curse pronounced upon man: "In the sweat of thy face shalt thou eat bread *."

The bramble shoots from the ground do not seem to bear the same year; but the side-shoots do; and the flowers form a spike. Some of the larger side-shoots bear nothing but leaves, and throw out roots at the head which grow if they meet the ground †, otherwise

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* Gen. iii. 19.

† The *βατος*, or *rubus fruticosus*, L. the common bramble, is characteristically described by Theophrastus, l. iii. c. 18. ὁ μεν

they begin to die the next year; but the side-shoots blow and bear fruit, and I believe die to the ground at the end of the year. It is a very singular plant, both as to the circumstances I have mentioned, and also because it bears its green, red, and black fruit and flowers, all at the same time. It seems, in a particular manner, to be provided for the nourishment and security of birds; and proves, even though we neglect it, of great service to man, by affording a spontaneous fence.

I subjoin a few simple directions for making this useful fence.

Cut down the quick fence when it begins to grow thin at the bottom. The third year lay it, that is, leave at every two feet, nearly, a large shoot; cut away all the rest to the bottom that will not twine; lay in such as will between the large ones, which serve as stakes, and bind the top with brambles.

Since I wrote this passage upon Brambles I found, among the Geoponic writers, an extract out of Diophanes, an author who is supposed to have lived about the time of Cicero, in which this plant is mentioned as proper for fences *.

(βατος) ορθοφυης, και υψος εχων· "one sort erect, and ascending;" ο δε επι της γης—νενευκως· "another sort trailing;" και οταν συναπτη τη γη ριζομενος παλιν· "when the end of the shoot touches the ground, taking root again." Nothing can exceed the accuracy of this description. (S.)

* We give this curious passage from Owen's Translation of Geoponic Authors, B. v. c. 44. vol. I. p. 183—185. "You will also

On Willows.

THERE is no tree which more deserves the particular regard and attention of landlords than the Sallow, or Willow species. 1. Because it grows upon grounds almost useless. 2. Because it is useful for many purposes in farming, and will always sell for hoops, stakes, and fuel. But we shall find ourselves much disappointed if we do not procure the right sorts. Some are brittle *, and may, indeed, serve for stakes or firing, but will be useless for other purposes. Some grow much quicker

make a hedge expeditiously if having rubbed a rope with the seed of the bramble, and having dug it into the ground, and cut some thick reeds, you plant them at a moderate depth in an oblique position, throwing manure in with the earth. Others form a hedge by making cuttings from shoots of the bramble, and laying them in the hedges, burying them a palm deep, and watering them till they shoot. Some also rub a rope with the berries, or ripe seeds, of the bramble, and having laid on some dung, water them till they shoot. But Democritus says, that a hedge is properly planted in this manner fifteen days from the beginning of the Spring. Rub a rope that has been much used at sea, and is become rotten, with the seed of the bramble of the Paliurus, L. and Oxyacantha, L. and cover it in a trench, watering it, if possible, every day. The hedge will grow speedily, and form a very good fence."

* The *Salix fragilis* of Linnæus. N. B. Mr. Stillingfleet mistakes the term *fragilis*, as applied to a species of willow: neither the shoot nor the timber of any sort has that quality, but the shoot *snaps off* in pruning any Crack Willow (S.)

than others. Some require a moist soil; others do well on the barrenest and driest ground. The right sort of willow will thrive both on marshy and dry soils, will shoot the first year, and its stakes will last as long as oak.

It behoves us therefore to procure the right sorts. But this is no easy matter. The farmer, the basket-maker, and the tub-maker, know many of them; but neither they, nor even the botanist, can so describe them as to convey their knowledge to others. Linnæus himself allows that it is extremely difficult to ascertain the species of this genus; a marshy, a sandy, a cold, or a warm soil, causing great variation in the same kind. Besides the descriptions of all authors are imperfect and barbarous.

We must therefore begin anew the history of these plants, and throw away the antient names, that we may avoid the confusion arising from dubious synonyms, and for the future we ought to describe, 1st, The buds, whether they have one or more valves. 2. How the leaves are folded up in the bud. 3. Whether the catkins arise out of the same bud, and whether above or below the leaves. 4. Whether the leaves be serrated or whole, and whether the surface be smooth or downy. 5. We must observe the number of the stamina. 6th, Whether they grow to the *full size* of trees, or are only shrubs, and whether they throw out joints at the boughs. Thus far Linnæus, who shews how difficult he thinks it to distinguish them, when he makes *magnitude* one mark of discrimination, which is directly contrary to his own principles.

But all the difficulties about these plants are not yet specified. Scopoli, who seems to be a very curious and observing botanist, in his Flora Carniolica, published at Vienna 1760, says, it is certain that very many sallows taken for different species are really nothing but varieties, as he is convinced from several reasons: 1. Because he has known many females fecundated by males of an apparently different species. 2. Variety of soil alone will give a very different appearance to them. 3. The smoothness, magnitude, colour, and form of the leaves, will be changed by culture. 4. From his own observations, which he promises to communicate to the publick at a future time *.

It were much to be wished that botanists would attend to this subject, as being of very great consequence and importance. But so it is; and I imagine there is no genus among those called perfect that is less understood in Botany. If any one would take the pains to clear up these difficulties, and, at the same time, observe the uses of the several kinds in the different places where they grow; the soil proper for them; the length of their shoots, &c. would deserve well of the publick *. I may however venture to recommend three well-known sorts.

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* A very antient epithet of the Willow, which occurs more than once in Homer, is ωλεσικαρπος· This Theophrastus interprets shedding its seed before it is ripe; but it appears to me that the profusion and waste of male flowers scattered in the air in the spring at the dissolution of the catkins, is the true meaning of Homer's expression. This property of the Willow cannot but give birth to multitudes of hybrid plants. (S.)

1 The Osier. Admirable for baskets; for which purpose it is cut yearly; and for hoops at the end of two years.

2. The almond-leaved Willow, known by the name of the sound-growing Norfolk Willow, which it well deserves when not headed; but when headed it decays. It is called in Herefordshire, where it is much esteemed, the Hop Sally. It makes great shoots, and is preferred by the Yarmouth tub-makers to any other wood.

3. The grey Willow, serves for stakes, and for large hoops, at about twelve or fifteen years growth. All these are good for fuel.

I recommend the planting of these trees, and ash, because landlords do not like their timber-trees deformed and ruined by cutting the hedge-rows. Nor can I blame

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* These observations were true when our author wrote, but Dr. Smith has justly merited the praise which Mr. Stillingfleet anticipated, by removing the difficulties of which he complains. That eminent Botanist has taken great pains to ascertain the different species of Willow; he has already (July, 1809), given no less than 47 engravings in the English Botany, and still continues his curious investigation.

them; but they ought to consider that the tenant must have wood for fences, for screens in the winter, for cattle, and for firing. This last article is as necessary as the others; because in many places coals are immoderately dear, furze not to be had, nor ling or heath, and it is not easy to procure wood. Even where coals are cheap, the farmer must have quick, &c. as firing for the oven, for scalding milk, and various other purposes.

I would recommend the following mode of planting willows and sallows. Instead of putting the cuttings into the ground, as usual, let a trench be dug, and lay them in, treading the earth close. Leave four buds above ground; and in wet soils, where the water cannot be carried off, they should be planted in raised banks.

I may seem whimsical in adding, that to plant willow fences may prove beneficial to the poor cottager. Yet surely it is but justice and good policy to consider them. It is but just that the labouring man, who works hard all day, should have a comfortable fire at night; and it is politic that his wife and children should be able to keep themselves warm enough to work, otherwise they must be idle, and become burthensome to the parish. It is also politic for another reason: many people, if they cannot procure fuel any other way will take the liberty to break fences, and do more damage, by making an opening for cattle to trespass, in one night, than a week's supply of firing would cost. We may reason and preach as much as we please, and punish as often as we can, but the breath of a pinching northerly wind argues much more than the gentle voice of conscience, or the loud threats of a justice of peace. To speak my mind freely, it is the duty of the rich and the powerful, who enjoy the greatest share of the advantages arising from society, to study to make those who do all the drudgery contented, as much as possible, consistently with due subordination; and not drive them, by neglect or hard-heartedness, to think they should be more happy in a savage state.

Let no one, from what I have said, imagine that I mean to have firing given *gratis* to the poor; I am not quite so chimerical. I only mean, that it should be in their power to purchase firing at a reasonable price. This, I am certain, might be done in almost any place were the waste ground on each farm properly planted. I call those grounds waste for which the landlord receives a very small rent, as 1*s.* or 1*s.* 6*d.* *per* acre, of which there is generally some on every large farm, the land being either very poor or boggy, and not drainable, or not worth draining. On poor land that most hardy tree the birch, and some sallows, and mountain ash, will certainly grow; on boggy ground the sallow and ash, if banks are only thrown up, as I have seen done in Yorkshire for this very purpose. These plantations, after the first expence, will bring in as much as some tolerable sorts of arable land. The banks should have no large trees left on them which would tempt a greedy landlord to frustrate the design, by saving them for timber. The same may be said of the other plantations. The wood should entirely belong to the farmer, for his own use and for sale, paying what is reasonable, as for the rest of the farm; and being bound in a proper manner to the term of cutting and quantity. The shaws in Surrey are something of this kind, and are even raised on very good land round many of their fields.

This scheme, well executed, would save the landlord's timber-trees, and take away all pretence from the poor to be as bad neighbours to farmers as the Cherokees and Chickasaws are to our American planters.

On the Oat, particularly the Pillas, Naked Oat, or Avena Nuda of Linnæus *.

OATS seem to have been unknown to the Greeks in the time of Theophrastus. It is true, he uses the word

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* *Avena nuda,* Linn. Sp. Pl. 116. Avena paniculata, calycibus trifloris; receptaculo calycem excedenti; petalis dorso aristatis.

A. nuda. Bauhin pin. 33. Raii Synop. 3. p. 389.

N. B. Affinis admodum sativæ, sed semina decorticata decidunt. Hab. o.

It is called the *Naked* Oat, because the grains, when ripe, spring naked from the husks. According to Professor Martyn, it is sown in the poorest croft-land, that has been tilled two or three seasons with potatoes, and, for the use of the poor, answers all the purposes of oatmeal; for fattening calves also it is accounted superior to any other kind of nourishment. It is a small yellow grain.

Bromus *, which seems to mean oats in Dioscorides;

It is not certain that oats, any more than wheat, have been found in a natural state. The author of Anson's Voyage, indeed, mentions them as growing wild in the island of Juan Fernandez, though they were more probably sown there by some preceding voyager. The same may be observed of the assertion of Mr. Bruce, who supposed he found the oat wild in Arvosie, a territory in Abyssinia, not far from the Nile. "Wild oats," he says, "grow up here spontaneously, to a prodigious height and size, capable often of concealing both the horse and his rider."

* The word Βρομος occurs only twice or thrice in Theophrastus, and cannot mean oats, which, Mr. Stillingfleet observes, was a grain not cultivated by the Greeks; for it is well known that horses in the East are still fed with barley; and therefore it is probable that if the use of oats had been once discovered that would not afterwards have been neglected. We find, likewise, that even in Spain and Portugal oats are not given to horses, a custom probably derived from the East. The Βρομος was, I think, the Secale *cereale* of Linnæus, or Rye. It is said by Theophrastus to be the most chaffy of all grains, and to have the greatest number of glumes (μαλιςα παντων πολυλοπος), and according to the Greek text corrected, the stalk is taller than that of wheat or barley (ὑψηλοτερος ὁ καλαμος του Πυρου και της Κριθης, lib. 8.) All these peculiarities are strictly applieable to Rye, and to no other grain. See Appendix, p. 637.

Linnæus, Sp. Plant. ed. 3. particularises twelve species of *Avenæ*; all of which are useless as grain for food, except 1. *Avena sativa, semine nigro*, Bauhin, whose habitat is unknown; and 2. a variety β. called A. *alba*, whose origin is said to be Juan Fernandez; and, 3. A. *nuda*, the naked oat, or pillas. See p. 626. l. 14. (S.)

but as he says nothing of their culture it is probable that he meant some other plant; at least it is certain they were not cultivated in Greece in his time. Servius and others assert, that oats were not known to the Romans; but they were evidently mistaken; for Pliny says *, that the Germans used to eat no other bread but such as was made of oats; and Columella † says, "Similis satio avenæ." Dioscorides ‡ speaks of the oat; but does not mention it as used for bread, like spelt, wheat, rice, barley, millet, panic. I am apt, indeed, to think it was used by the more Northern nations, and very likely the wild oat, till they found the other.

Of this species our old herbalist Turner observes: "There is another kind of oats, called pillotes, which grow in Sussex. It hath no husk abiding on it after that it is threshed, and is like oatmeal. This kind groweth in no other country that ever I could tell of, save only in England. Neither have I read, in any new or old author, of this kind. The men of the country say that it will not grow in a fat ground, but in a barren ground, where no corn hath grown before it §."

Gerarde also mentions it as common in Norfolk and Suffolk.

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* Lib. i. c. 17. † Lib. xi. c. 11. ‡ Lib. ii. c. 116.

§ Turner's Herbal, part i. p. 73.

This kind of oat (Avena *nuda*, Linn.) is still cultivated in some parts of England, particularly in Cornwall, under the name of *pillas*. I sent some queries on this subject to the Bishop of Carlisle (Dr. Lyttleton); and the Bishop having transmitted them to Dr. Borlase, well known for his History of Cornwall, received the following answer:

Queries.

1. What mill is most proper for grinding the grain into meal, the wheat or oat mill? 2. Why should it be of a price equal to wheat? 3. In what uses is it employed?

Answer.

Your Lordship's enquiries about the *pillas* are these: 1st. What mill is most proper for grinding the grain into meal for bread, the wheat or oat mill? The latter; but we never try it for bread, having so great plenty of wheat and barley, that we sow very little rye, and not enough of the oats for our own use. It is thought the grain you sent me of your growth was cut a little too bright, there being a good deal of *budds*, or *buddiss*, as we express it, on some grains, which in winnowing might be taken off, and would prove exceedingly good for chickens; in other respects the grain is equal if not superior to ours.

We sow this grain in February; perhaps this may be too early for your frosts. If we sow it later, the grain will not fill so well; if earlier, the frosts are to be feared.

Eighteen gallons in an acre is sufficient seed, and in the warmest land, such as has borne potatoes, &c. we think we have generally the larger and fuller grain. If it is sown in fat land the stalk will grow shaggy and weak, and go to age, and be fit only for manure, and the grain very slight and not horned, that is, stunted and imperfect. The straw of the *pillas* makes a tougher neater rope for thatching corn, for fuel, and the like, than the straw of any other grain.

Secondly, you enquire, Why should the grain of *pillas* be of price equal to wheat? I answer, because as the grain is small, multitudes go to the bushel. It has no bran; it yields as much meal as wheat. It is therefore intrinsically worth as much though not for bread; is as profitable as wheat, and more so for many purposes. One bushel of pillas is worth two of barley, for the several purposes under mentioned. A bushel of good oats will make half a bushel of *grits*, so we call oatmeal; but a bushel of *pillas* will yield a bushel and a quarter of *grits*, and will increase too in grinding. The way in Cornwall to prepare *pillas*-seed for domestic use is first to winnow it, then to dry the quantity you choose in a kettle, stirring it continually over a gentle fire, till it has cast its sweat, which will be for one gallon fifteen minutes; then let it cool, and grind it for use, to about the roughness of common oatmeal.

Thirdly, What uses is this grain chiefly put to in Cornwall? The *pillas* make sweeter *grits* for milk-pottage than any oats; but the *grits* are not so white as those of white oats for broth, and therefore not so much used in the latter way; but as milk-pottage, with half milk half water, for saving the milk, it is a principal diet amongst the poor; *pillas-grits* are much preferred because of their superior sweetness.

Pillas are the best of any grain whatever for feeding pigs if managed thus: Take a gallon, or what quantity you please, of the seed; cover it with the same quantity of water, in a vessel or brass pan, so as that the vessel shall not be above half full. Set it over the fire in the evening, and bring it to boil. Let it simmer for the space of eight hours on a gentle slow fire, or on the embers, till morning, and then it will be about the consistency of pudding, and be swollen to double the quantity. Give to a middling pig two quarts of the mixture at a meal, three times a day, with wash at proper intervals to drink; and one bushel of pillas will do the service of two of barley, and make better, that is, firmer flesh.

Pillas are very useful for rearing calves in the house, after weaning, and are thus managed. Take three gallons of water, put to it one quarter of the grits of *pillas*, and let it boil an hour and half, and it becomes a good gruel, of which give the calf at first three quarts at a meal, and, as he grows larger, more, till he is able to take a gallon or five quarts at a meal, and fit to be turned out to grass."

A crop sown on March 8 came up April 7, that is, in twenty-eight days.

The time for sowing *pillas* or naked oats is just before barley, in cold, loose, or gravelly ground and hilly, and perhaps it might answer on better ground. It is of the same value with wheat, by the price of which it is governed. The straw is excellent.

Sheep.

On this article Mr. Stillingfleet certainly intended to have been minute as well as accurate, as is evident from the number of his references. His attention was particularly turned to the Spanish breed; and he notices various communications from Mr. Aldstroemer, a pupil of Linnæus, who had travelled into Spain for the purpose of obtaining information on this subject, and many quotations and extracts from different authors. But as these last extracts contain nothing which has not been laid before the publick, and are accompanied by no opinion of his own, we shall submit to the reader only the few notices which he drew from his own observation, or the communications of practical farmers.

Mr. Stillingfleet observes, an hundred sheep folded will dress twelve acres in a year. In the day-time it is reckoned they do as much good by feeding. Three sheep to a square of four hurdles when they dress, which is equal to ten loads of good dung *per* acre; so that an hundred sheep are as good as two hundred and forty loads of manure, or twenty *per* acre.

Edwards, shepherd to Mr. Bowyer, who has followed that business the greater part of his life, says, that sheep are never injured by feeding on St. Foin, or Black Nonsuch *(Medicago Lupulina)*; as they are on clover; that they may be put on St. Foin the first year at Michaelmas, without hurting it; but must be taken off at Candlemas: that they are fond of, and thrive on the marsh bent-grass *(agrostis polymorpha palustris*, Hud. *alba*, Linn.), and even prefer it to some grasses that are thought much better. He also says that sheep fatten much sooner when not folded.

According to information from Josiah Ridgeway, bailiff to Mr. Price, of Foxley, and a very able farmer, the manner of managing sheep in Herefordshire is as follows: Ewes and wethers are separated in their pasture, and cotted apart, &c. The rams may run with the ewes from September 24th to December 30th, and are then turned to the wethers. Thirty ewes are allowed to a ram. Fodder every morning and evening with pea or bean halm, and what is left serves for litter. Clean the cot in October and April; but not more than twice a year, because it keeps the lambs the warmer; and if there were three feet of soil under them the better. Put clean straw over the soil as soon as it begins to be dirty. The sheep are not turned out till ten o'clock in the months of September and December, because the dew, which lies long on the grass gives the rot. The cot for the sheep is twenty feet by thirty, with a parting of ten feet for the ewes in yeaning time.

We bleed the sheep in May, and the wethers in September, for they are apt at that time to die of the blood. All the old sheep in general are bled in September in the nostrils. They lick the blood as it flows, which scours them.

Fallows are kind for sheep in the Summer, but not for store-sheep, or those between a year and two years old, at which time they are turned out to fat. From a year to two years and a half old they are kept on bad pasture; for if they were changed from good to bad they would pine, and be attacked by the rot. Let not the store-sheep get in too high order in the Summer, but keep them well in Winter. The lambs ought to be kept well from the time they are weaned till they are a year old.

We wash and shear in May and August. The lambs are cut in April; washed, weaned about June, and the first year sheared about July 28. Sheep are never killed under three years. We do not cut the lambs till they are a year and a quarter old. After shearing we cot all the sheep for a fortnight to prevent them from taking cold. We put brakes, or fern, round the inside for fodder.

By the preamble of a statute made in the time of James I. allowing tenants to inclose one third of their lands, meadow and pasture, in some parts of Herefordshire, it appears that they used to house their sheep the whole year. The same practise still continues. They are housed and fed on high grounds; whereas housing is no where else practised; and in most countries they are fed on low meadows or rotten commons, and left to seek their sustenance during the whole Winter. The advantage of this treatment is principally evident in the wool; which, though less in quantity, fetches a higher price than that of other counties *.

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* Against cotting or home-feeding sheep, a practice so antient and well established in Herefordshire, I have never heard or read one single objection. As to turning out these poor delicate creatures to bring forth in a state of misery and starvation, amidst the snows and deluges of winter, upon the bleak heath or marsh, coolly calculating how many per hundred ewes or lambs we shall lose, and how stoutly they will starve, is a practice as barbarous as bull-baiting. They are kept to be fed, and they never will pay better for feed than in the winter, during which the loss, instead of thirty *per cent.* which is too often the case, would probably not exceed one, the flock going the summer in full health, and being double the worth of starvelings. New Farmer's Calendar, p. 522.

APPENDIX.

No. I.

Of the Grasses mentioned by Theophrastus.

MR. STILLINGFLEET having left few *memoranda* respecting the grasses of Theophrastus, I have been favoured by my ingenious friend Mr. Stackhouse with the subjoined catalogue, which I think will prove a necessary appendage to a work like the present, and fulfil what would undoubtedly have formed part of the Author's plan had he lived to complete it.

1. Αγρωστις twice occurs in Theophrastus, and, as in one of these it is in the plural number united with the Reed *Genus*, οἱ καλαμοι και αγρωστεις l. i. c. 10. it cannot be supposed to designate any particular *genus*. It is compounded of two words, αγρος ἱστις which imply *the Clothing of the Field*. In the second place it occurs as a *Genus*, or species, in company with the *Cyperus* of Linnæus, as having "trailing roots, throwing up shoots from the knots;" in which we recognise the *Agrostis stolonifera* of Linnæus, l. iv. 11. Many grasses have the same property, particularly the *Triticum repens*, "the common couch grass."

Αλωπεκουρος, is mentioned l. vii. c. 10. It is described as σταχυωδης, having a simple spike, which has soft and silky, not bristled awns, like Barley. Linnæus has constituted a Genus *Alopecurus*, none of which bear much resemblance to the tail of a Fox; but among the specimens delineated in *Flora Græca* is a beautiful grass, called *Phleum crinitum*, which grows in the moist ground near Athens, and which perfectly resembles a Fox's tail. Vid. Fasc. 2. t. 62.

3. Αιρα, *Lolium temulentum*, Linn. Ang. Darnel grass, is particularly described as to its habits, and the effects which the use of the grain produces, βαρυ και κεφαλαλγες "inducing stupor and head-ache," which is a remarkable circumstance. It is said to be hardy, enduring the Winter, and delighting in a wild state. The circumstance of its leaves and stem assuming a gloss in the Spring is likewise mentioned, l. viii. c. 7. and is strikingly true of this grass, and its *congener* the Ray grass; likewise that it exhausts and impoverishes the soil, viii. 9.

4. Αιγιλωψ; certainly not the *Ægilops* of Linnæus. It occurs thrice in Book viii. ch. 7. It is said to have a pubescent narrow leaf, and is united with the preceding species, ch. 8. It is said to infest Barley crops, ch. 11. The remarkable peculiarity respecting the germination of the seed is recorded, viz. that it never springs up, or infests any land which has not been previously prepared for tillage. These qualities agree very well with the *Avena fatua*

Linn. our "Wild Oats;" and travellers may ascertain whether this grass is a native of the South of Europe. It might, however, be doubted whether, as the Αιρα of Theophrastus is a spiked-grass, and the Avena *fatua* is panicled, there is sufficient affinity to admit of their being united by him as above. In that case the Triticum *repens*, Linn. our common "Couch grass," seems to answer the description.

5. Βρομος; It is necessary to notice this as a grass, as Linnæus has constituted a genus of it, including numerous species; but as in the two passages where it occurs in Theophrastus, it is united with the frumentaceous species, it can have no affinity with the Genus *Bromus* of Linnæus. Having enumerated the different kinds of what he calls σιτηροι (those that yield food from the grain,) he says the most chaffy of all of them is the Βρομος, and its stalk is taller than those of Wheat and Barley. In this description it is easy to recognise the habits of Secale *Cereale*, Linn. "The Rye" of Agriculture.

6. Ελυμος. This *genus*, together with the following Κεγχρος, occurs twice in Theophrastus, l. viii. c. 1. 10. and appears to have been cultivated by the ancients on account of its seeds, for culinary purposes. They form a third division of frumentaceous plants; the first of which are the σιτηροι, the second χεδροποι (Corn 1. 2. Pulse), and these two species together with a plant called Σησαμον, probably the *Sesamum* of Linnæus, are said to be ανωνυμοι κοινη

πρωσηγοριᾳ; that is, not "corresponding with either of the former divisions, yet, having something in their habit resembling each other," viii. c. 1. They are said to have their seeds inclosed in a φοϐη, a sort of capsule; and this agrees very well with the *Gluma uniflora, valvulis subovatis,* the turgid glume of Genus Panicum of Linn. Gen. Pl. 76, under which our Millet plant is included; as likewise with the *Gluma uniflora bivalvis, valvulis ovatis acuminatis,* which forms a sort of turgid capsule in the spike of *Genus* Milium of Linnæus. This evinces the accuracy of Theophrastus's descriptions. It is worthy observation that many of the grasses which have round seeds are furnished with a sort of capsular swelling glume.

7. Κεγχρος. this is coupled with the preceding grass as an affinity; and therefore, I think, must be sought for among the species of Panicum, Milium, or some of their neighbouring *genera.* Cenchrus, of Linn. is in the class *Polygamia,* Ord. 1. P.*Monæcia,* with several other grasses. This does not exclude it from a claim of being the Cenchurus of Theophrastus; especially as the glume is *concave,* and the seed roundish, L. Gen. Pl. 1149; but neither of the species in Linnæus is likely to have been cultivated for seed, and the specimen delineated in the Flor. Græc. t. 100, is of a very diminutive species.

8 Ποα. in Theophrastus is of still more general acceptation than Αγρωστις. It is applied to herbaceous plants in general; and to the herbaceous or succulent parts of plants, as tender shoots, leaves, &c. In no passage, except l. iv. c. 10, is it applied to any particular

species; in that chapter a marsh plant of Ægypt is mentioned of particular luxuriance, which is cut green for pasture, and is made into hay.

9. Ισχαιμων. Ischæmum *muticum*, Linn.? This may be the Linnæan plant from the remarkable styptic quality of its roots, from whence the Greek name, l. ix.; but it is more likely to be the Andropogon *Ischæmum*, Linn. Sp. Pl. 1483.

APPENDIX.

No. II.

By some mistake, the Index to the Calendar of Flora was omitted with the article in Mr. Stillingfleet's Preface which relates to it. Both then are therefore given in this Appendix.

"I once designed to place the two Calendars over against one another in opposite pages, part by part, according to the days of the month; but upon consideration, I found the climates being so different, that there would be great vacancies in many of the pages, at the same time that the same plants would be in different pages, and the bulk of the book would be increased without any advantage to the reader; I therefore thought it would be better to make an Index, which will furnish an easy method to the curious of comparing the two climates."

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*** The large Roman Numerals refer to the Months of both Calendars; the small Numerals to the Days of the Month of the Swedish; the common Figures to the English.

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